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Feasiblity of Food Price Monitoring in Rural Areas

Final Report

October 1996

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Authors:

Joel Popkin
Jack Rutner
Kathryn Kobe
Rakesh Kochhar
Eva Jacobs
Helen Jensen

Submitted by:

Joel Popkin and Company
1101 Vermont Avenue, NW
Suite 201
Washington, D.C. 20005

Project Director: Joel Popkin
Principal Investigator: Jack L. Rutner

Submitted to:

Office of Analysis and Evaluation
USDA Food and Consumer Service
3101 Park Center Drive, Rm. 214
Alexandria, VA 22302

Project Officer: Margaret Andrews

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FINAL FEASIBILITY REPORT

FEASIBILITY OF FOOD PRICE MONITORING IN RURAL AREAS

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GLOSSARY OF ABBREVIATIONS

BLS	Bureau of Labor Statistics / U.S. Department of Labor
CATI	Computer Aided Telephone Interview
CES	Consumer Expenditure Survey
CPI	Consumer Price Index
CPS	Current Population Survey
ERS	Economic Research Service / U.S. Department of Agriculture
FCS	Food and Consumer Service / U.S. Department of Agriculture
JPC	Joel Popkin and Company
NASS	National Agricultural Statistical Service / U.S. Department of Agriculture
PC	Private Contractor
POPS	Point-of-Purchase Survey
PSU	Primary Sampling Unit
TPOPS	POPS conducted by telephone interview
USDA	U.S. Department of Agriculture

EXECUTIVE SUMMARY

The Food and Consumer Service (FCS) of the U.S. Department of Agriculture (USDA) desires to monitor how the movement in prices of food items typically bought by rural households compares with the movement of those bought by urban households. Information on the movement of prices paid by urban consumers for food items consumed at home has been available since 1978 when the Bureau of Labor Statistics (BLS) defined the scope of the Consumer Price Index (CPI) to be all urban households. The most logical and direct answer to the FCS question is to develop a food price index for rural households that can be compared with the CPI component for food at home. But, there are various ways that can be accomplished. This report identifies, describes and evaluates them.

The first step in any of them is to determine the areas of the country that comprise an adequate representative sample of rural households and then conduct a point-of-purchase survey (POPS) for rural households. The Census Bureau (Census) now conducts a POPS for BLS which determines where urban households represented in the CPI shop. That survey for rural households may show that they shop largely in urban areas. If so, the FCS could construct a rural price index by reweighting BLS price indexes for food item categories by the percentage shares of spending by rural households on those categories, if those shares differ from urban ones. Data on those shares are collected in the annual Survey of Consumer Expenditures (CES) that BLS now uses for urban spending patterns.

If the POPS shows that rural households shop for an important share of their food in rural areas, it will be necessary to construct a food-at-home price index for rural households that is comparable to the CPI. The most direct way to do that is for BLS to construct a rural food price index using the same methods it uses for the CPI. Doing that is the best way to insure that the rural and urban food price indexes are comparable, so that differences in movement between them can be ascribed to market behavior differences, not to methodological ones.

BLS is interested in conducting this work for FCS. The main consideration in deciding whether to contract with BLS or another organization would be differences in costs that were large enough to outweigh the advantages associated with the degree of comparability achievable. It turns out that, based on the cost estimates developed by Joel Popkin and Company (JPC) for this report, BLS is cost competitive. The competitiveness of BLS extends to both the start-up period and to the subsequent annual costs of the ongoing program, vis-a-vis all approaches that can now be costed, save one. In that one, price collection is turned over to the National Agricultural Statistical Service (NASS). This approach envisions that NASS staff would be trained by BLS, use BLS methods and specifications for selecting items to be priced and for pricing them, and that BLS would compile the index, using CPI methods and programs, once NASS sent them the price data. Some cumbersomeness and the need for more complex USDA coordination of the process, probably by FCS, must be weighed against the saving which, at this stage of cost estimation is probably not significant.

The BLS cost is below that of another approach explored in this report. It is premised on contracting for price collection with a private firm. The approach has two variants. In one, the contractor is assumed to have a small staff, dedicated to food price collection, that will travel from one rural place to another. In the other, the contractor is assumed to use a part-time price-collection staff dispersed over the country to minimize travel costs including time. The cost of the dispersed staff is below that of the small-staff model. But neither is cost competitive with the BLS nor NASS alternatives. That is because BLS can utilize a large, dispersed part-time staff--its own--and because its staff is already trained for the task of price collection.

Besides the BLS, NASS and private contractor approaches, a fourth alternative was considered. It is to use optically scanned data, augmented by some staff field collection to obtain price quotes. While the use of such data for price indexes may eventuate in the future, its use now as a source for rural prices would significantly diminish comparability with the urban CPI. To compare the movements of urban and rural prices would require that a totally

new scanner price index be calculated for urban households. This would make the use of scanner data too costly under present circumstances.

As noted earlier, the first step in this process is to conduct a POPS. Indications are that private contractors may be able to conduct that survey at lower cost than Census. If so, BLS might choose not to publish the index as its own official index or to publish it with a technical footnote that might include a BLS assessment of the potential impact of the non-Census POPS on the comparability of the index. The FCS will have to consider the type of BLS imprimatur it desires in deciding who should conduct the POPS.

Once the price collection is begun, it will probably be necessary to calculate the rural food-at-home index for several years to compare its movement with the CPI for food at home. A sound way to make the comparison is to calculate and publish the index every other month, which would coincide with BLS pricing cycles for the CPI. Percentage changes in the bimonthly index and its components from their value a year earlier would facilitate comparisons with the urban CPI without having to obtain a time series long enough to facilitate seasonal adjustment. An understanding of the results of the comparison would be easier if the rural index can be published for each of the five major categories of food at home. By analyzing those categories, and the more detailed indexes likely to be available in tabulations that may not be officially publishable by BLS, it should be possible to determine if rural prices rise faster or slower than urban prices, and, if so, why. Is the difference in aggregate behavior across the board, or is it due to certain items purchased in certain types of stores? Obviously, if there were no differences of concern to FCS, it could continue to track food prices faced by rural households by using BLS indexes for detailed food expenditures in the urban CPI and, if necessary, weighting them by the rural spending patterns measured in the CES.

This report will form the basis for the development by JPC of a recommended action agenda for USDA. That agenda, when presented to USDA officials at a briefing, is the final deliverable of this contract.

I. INTRODUCTION

This *Final Feasibility Report* is one of the final deliverables under USDA contract #53-3198-5-083, "Feasibility of Food Price Monitoring in Rural Areas," awarded to JPC. The remaining deliverables are the *Action Agenda* and *Briefing Materials* that reflect a weighing of all the issues identified and evaluated in this report bearing on the question of how to measure the movement of food prices faced by rural households.

The purpose of this section is to inform the reader of the organization of this report. This report contains seven major sections (II through VIII) and nine appendixes. Section II provides background about the reasons for the study. It also explains the phases in which the study was conducted and indicates the individuals and groups associated with each phase.

Section III provides essential discussion of the data collection systems that hypothetically could be used to achieve FCS's objectives. That section, and the rest of the study, are structured to delineate four kinds of considerations in devising the data collection systems: conceptual; methodological; organizational; and budgetary.

Sections IV through VII of the report are each devoted to the description and evaluation of one of the four approaches considered to be most likely to achieve the analytical objectives of FCS. The organizational, operational and budgetary aspects of each is discussed as well. Due to the complexity of deriving costs for the alternative approaches, detailed information on the derivation of costs has been placed in several appendixes. Appendix 4 describes the general costing model used. Appendixes 5, 6 and 7 present detailed cost estimates for the three alternatives for which costs could be estimated.

Section VIII, the final section of the main report, presents the pros and cons of each of the four alternative approaches. These pros and cons are a basic input to the development of the *Action Agenda* mentioned earlier.

There are five other appendixes in addition to the four previously described. Appendix 1 summarizes, in a matrix format, the range of research questions that FCS could have interest in and how each might be answered. The matrix was used in the early stages of the project to help in defining precisely the main question the FCS wished to focus on in this study.

Appendix 2 reports the results of a field test conducted to determine the time requirements that might be encountered in collecting food prices in rural areas. Appendix 3 describes the point-of-purchase survey, a key instrument in determining where rural households shop, and, to some extent, the items they buy. A number of statistical sampling questions arose in this study; key questions are addressed in the report of a consulting statistician found in Appendix 8. A final appendix identifies the members of the Expert Panel and their respective areas of expertise.

II. BACKGROUND

The affordability of and access to a nutritious and safe food supply is an important objective for the USDA's FCS. The primary goal of USDA food-assistance programs is the provision of nutrition security. Questions have been raised about whether persons living in rural areas of the U.S. generally have the same access to sources of nutritious food the urban population has. Past studies have shown, albeit on a limited basis, that the cost of acquiring a given market basket of food also can be higher in underserved areas and that varieties of nutritious foods are more limited.

A related question, and one about which nothing is presently known, is how do food prices behave in rural areas? The CPI compiled by BLS measures price changes only in the urban areas of the U.S. For that reason FCS is interested in determining the feasibility of monitoring food price changes in rural areas so they can be compared with those experienced by urban households. The purpose of this project has been to examine methodologies to monitor prices in rural areas and to assess their feasibility.

Work on the project was divided into four distinct phases. The first was meeting with FCS, forming an Expert Panel and then meeting with the Expert Panel and FCS staff. The second was the *Conceptual Assessment Report*. The third was the *Feasibility Study* and the final one is the *Action Agenda* that will provide recommendations.

In the first phase, members of the research team met with FCS staff to focus on defining the specific research objectives of the study. The need to define specific objectives arises because the affordability of food in rural areas of the U.S. can be assessed in a number of ways. Also, price collection methodologies are not independent of the question being asked. What emerged from the first meeting of the research team with FCS led to a *Memo of Understanding* (MOU). It contained a "matrix" listing six possible research questions and the price-collection methodologies that would satisfy each question. The matrix is found in Appendix 1.

Another purpose of meeting with FCS was to form an Expert Panel that would advise the research team. The members selected for that Panel were expected to contribute independent ideas based on their expertise in the areas of price collection and food stamp and nutrition programs. The Expert Panel was also expected to review the design of the study and interim findings from different stages of the research.[1]

Part of the first phase of the project was to meet with the Expert Panel and with FCS. An important part of the discussion during this meeting was the matrix of research questions and price-collection methodologies. The decisions to emerge from that meeting were critical to the writing of the *Revised Study Plan.* The *Revised Study Plan* outlined the final research objectives for this project and formed the basis for all subsequent work.

A key decision of the first Expert Panel meeting was that the principal focus of this project would be the following question:

> *How does the movement in prices of food items typically bought by rural households compare with the movement in prices of food items typically bought by urban households?*[2]

One way of answering that question is to construct a price index for food at home faced by households living in rural areas of the U.S. using techniques similar to those used by BLS. An index produced by such methods could then be compared to the CPI for food at home which is based on prices faced by urban households. The rural food price index would be national in scope, it would cover the households in rural areas not included in the CPI, and it would not be limited to food-stamp households living in rural areas or to the market basket purchased by those households. It was also decided that the research would examine the

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[1]See Appendix 9 for a list of the members of the Expert Panel and the areas of their expertise.

[2]This is a variant of question 4 in the matrix found in Appendix 1.

feasibility of constructing a price index for food at home using scanner technologies to collect price data.

The decision to focus generally on comparing price changes, essentially to replicate a CPI for food at home in rural areas, leaves unexplored the possibility that at some point interest may surface in a method for comparing the level of prices in rural areas with the level in urban areas. Price-collection methodologies currently in use, especially the BLS methodology, are specifically designed to measure price changes over time. A comparison of price levels across different areas may serve some USDA goals but would require a significant departure from those methodologies.

The second phase of this study involved the preparation of a *Conceptual Assessment Report*. The purpose of the report was to review various possible methodologies for price collection in rural areas. An important goal was to develop a full understanding of the BLS methodology for compiling the CPI with particular reference to its applicability to monitoring food prices in rural areas.

The methodological review for the *Conceptual Assessment Report* encompassed issues such as sampling procedures, staff training, price collection methods, data editing, and index construction. That work was accomplished through a combination of literature review and interviews with staff members from BLS, Census, and private data-collection companies. Alternative price-collection procedures such as the use of electronic scanners were also considered.

The Expert Panel convened twice more during the second phase to provide input to the research team. In the first of those two meetings, the *Conceptual Assessment Report* was the principal subject of discussion. The review of alternative methodologies during that meeting was key to developing an initial list of hypothetical data collection systems. Most of the data collection systems hewed closely to the BLS methodology differing mainly in their organiza-

tional and operational aspects. The most significant methodological departure was a hypothetical system relying upon the collection of price data via electronic scanners.

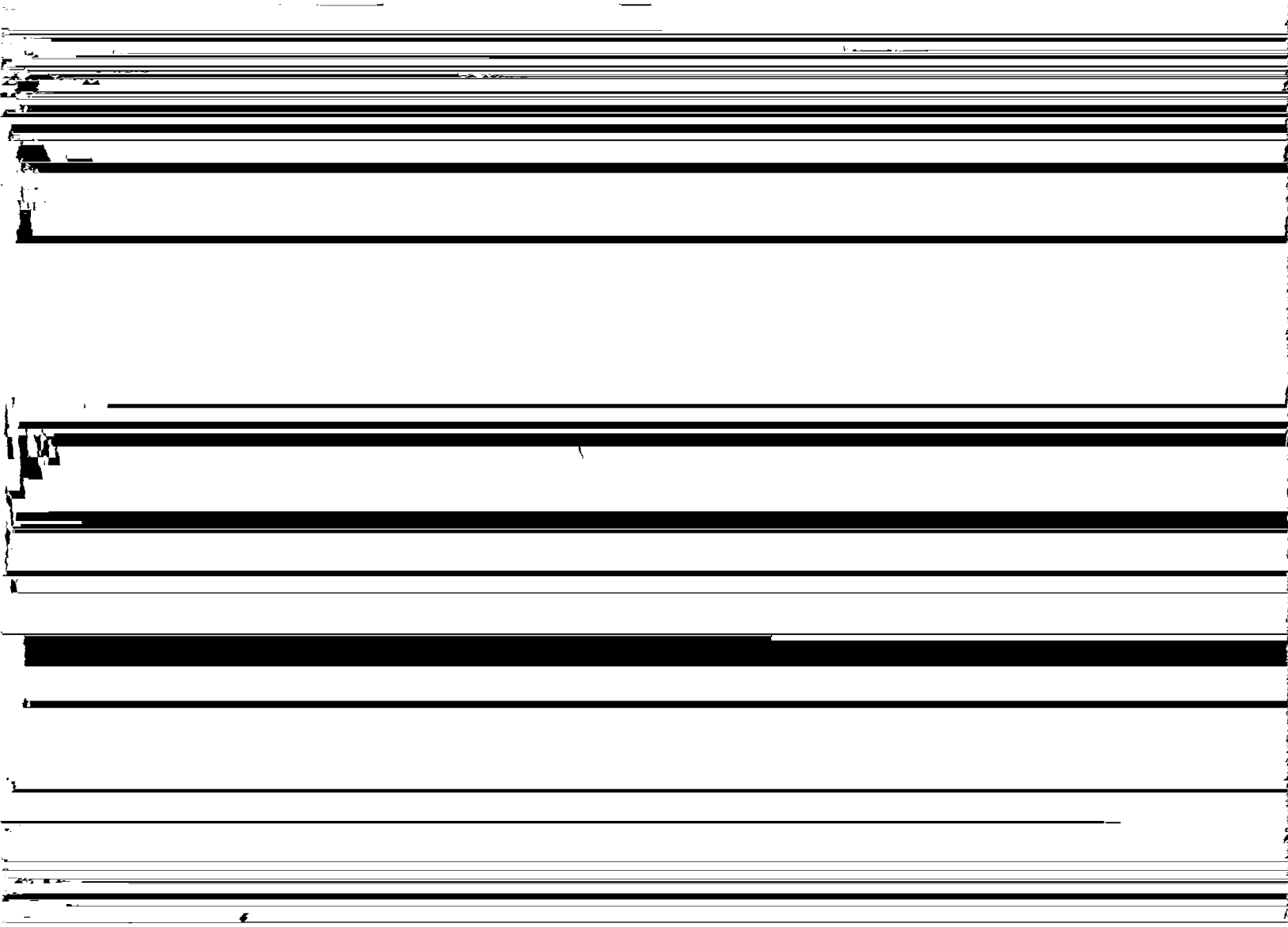
In the second of the two meetings during phase two, the Expert Panel convened to review the preliminary list of hypothetical data collection systems. That meeting and a subsequent meeting with FCS were instrumental in shaping the final list of hypothetical data collection systems presented in this report.

The third phase of the study was to discuss conceptual, operational and cost factors associated with several hypothetical price collection scenarios. The present report is the culmination of the third phase.

The final phase of this project will conclude with the delivery of an *Action Agenda* that will provide a set of recommendations regarding the best methodology for monitoring food price changes in rural areas.

III. THE HYPOTHETICAL DATA COLLECTION SYSTEMS: AN OVERVIEW

The purpose of this section is to provide an overview of the hypothetical data collection systems that will allow FCS to monitor changes in prices of food items typically bought by rural households. These systems are intended to lead to the construction of a price index for food purchased by rural households. That index could then be monitored relative to an index of food prices faced by urban households.



to arrive at the price index needed to compare food-price movements confronting rural and urban households. One system relies upon the BLS methodology and would lead to rural price indexes that can be compared directly to the CPI for urban households. The second system uses scanner technologies to collect prices in outlets frequented by rural households. Because this system is a significant departure from BLS methodology, the index produced by it cannot be compared to the CPI for urban households. Thus, this system would require producing both

other words, rural households covered by this index will be those residing in areas outside of metropolitan areas and other urban places with at least 2,500 people. Rural households, so defined, account for about 14 percent of all U.S. households.

Another key aspect of the rural food price index is that it would cover all food-at-home items typically purchased by rural households. In other words, the index will not be constrained to reflect specific market baskets, such as the Thrifty Food Plan market basket, or to reflect the expenditure patterns of specific types of rural households, such as food-stamp households. Price data for the index will be collected mainly from a sample of stores located in rural areas. If rural households are found to shop in urban stores, price data for those stores will be collected either from BLS or from scanner data. The rural food price index will be designed to measure the change over time in food prices faced by rural households. The principal policy question addressed by the index is whether the CPI yields an adequate approximation to changes in rural households' food costs.

III.A.2. Price Indexes and Their Construction

The purpose of a "price index" is to provide a way for combining many separate prices into a single number. This makes it possible to compare the percentage change in price from one time to another for a group of commodities and/or services. The determination of which prices to combine will depend upon the use to which the price index will be put. Thus, for example, a price index that is meant to measure the course of consumer food prices would obviously combine only the prices of food items typically purchased by consumers.

The construction of a price index requires a method for collecting the data needed for the index and a method for aggregating the data into an index. With respect to data, there are two key components of an index: expenditures and prices. Data on expenditures are used to combine the prices of the various items that are part of an index. For indexes attempting to measure changes in consumer prices, the expenditure component of an index is based on household expenditure patterns. The expenditure component is generally drawn from a specific

time period and is not changed frequently. For example, the expenditure component of the CPI is revised by BLS every ten years.[3]

The construction of a consumer price index can be decomposed into the following five steps:

1. Survey households to determine expenditure patterns;

2. Survey households to determine the outlets (i.e., stores) from which purchases are made and use the results to select a sample of outlets from which prices will be collected;

3. Conduct an initial survey of the sample of outlets to select the items whose prices will be representative of each expenditure category to be included in the price index;

4. Perform routine surveys of the same outlets to collect the prices of the representative items at different points in time;

5. Verify price data and compute the price index for each time period.

Each of the five steps outlined above can be performed in a number of different ways depending upon the specific objective and choice of methods. In this report, the word "methodology" will be used to refer to all aspects of price index construction as enumerated above.[4] The various hypothetical data collection systems described below in this paper share

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[3]Some changes in purchasing habits are captured every year based on the results of annual expenditure surveys. This involves adjusting the probabilities with which items are selected for the CPI pricing sample. BLS has also introduced a new method to sample outlets and aggregate price quotations for each item. However, the expenditure weights that are used to combine prices of different items, technically called strata, are revised infrequently which is one reason that the CPI may not be a true representation of changes in the cost of living faced by consumers. Households—urban and rural—are likely to switch away from commodities that have become more expensive and towards commodities that have become relatively less expensive, but such cost-moderation behavior by consumers is not immediately reflected in the CPI.

[4]There are, of course, other aspects of index number construction but they are not critical for the purposes of this report. An example of a methodological issue not discussed here is the choice of an index number formula. Several other issues were covered previously in the *Conceptual Assessment Report*.

a common objective and confront similar methodological choices. They differ with regard to some details but also share in several others. The common aspects of the methodologies used by the different hypothetical data collection systems are discussed below.

III.B. Methodological Issues

III.B.1. A Benchmark Methodology

In view of the research objective, a key part of this research has been a thorough review of BLS methodology and its applicability to the construction of a rural food price index. Because the BLS methodology serves as the point of departure for all but one of the hypothetical data collection systems, it is described here as the "benchmark" methodology. The purpose of this section is to describe this methodology in the framework of the five steps (listed earlier) needed to construct a price index.[5]

The first step that must be taken for the construction of a price index is to determine the expenditure patterns of households that will be covered by the index. Because of the national scope of the CPI, these data are collected by means of surveying a random sample of households. The design of the sample and the actual expenditure survey are done on an ongoing basis by Census for BLS. This survey is called the *Consumer Expenditure Survey* (CES). The objective of the CES is to provide the basis for revising the expenditure components and pricing samples for the CPI and to meet the need for timely and detailed information on consumption patterns of different types of families in different areas of the country.[6] An important aspect of the CES is that it covers both rural and urban households.

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[5]Further details on the BLS methodology can be found in the *Conceptual Assessment Report* or in the *BLS Handbook of Methods*, U.S. Department of Labor, Bureau of Labor Statistics, Bulletin 2414, September 1992.

[6]The CES consists of two parts, a quarterly personal Interview and a Diary Survey which is completed at home by the respondent for two consecutive 1-week periods. The Diary Survey was designed to collect detailed expenditures for frequently purchased items which would not be remembered over a three month period. One such set of items includes food. The daily expense record is divided by day of purchase and by broad classifications of goods and services—a breakdown that aids the respondent when recording daily purchases. The diary

From the point of view of a rural food price index, this means that the first step is already fulfilled by Census and the USDA does not need to arrange for the collection of data on the food expenditure patterns of rural households.

The sampling design that Census uses for the CES has implications for the CPI as well as the rural food price index. Census first maps out the U.S. into small areas called *Primary Sampling Units* (PSU's) and then randomly selects a subset of those areas where it will conduct its surveys. For a forthcoming revision of the CPI, Census has selected a sample of 107 PSU's for the survey of consumer expenditure patterns. A map showing the locations of those PSU's is on the next page. The map also shows that there are four principal types of PSU's: *A, B, C,* and *D.* The *A* PSU's are the large metropolitan areas that are drawn automatically into the CES. The *B* PSU's are a set of smaller metropolitan areas of the U.S. that are selected probabilistically. The *C* and *D* PSU's, of which there are 28, are non-metropolitan areas also selected probabilistically. Together, these four types of PSU's are intended to represent all of the U.S., rural and urban.[7]

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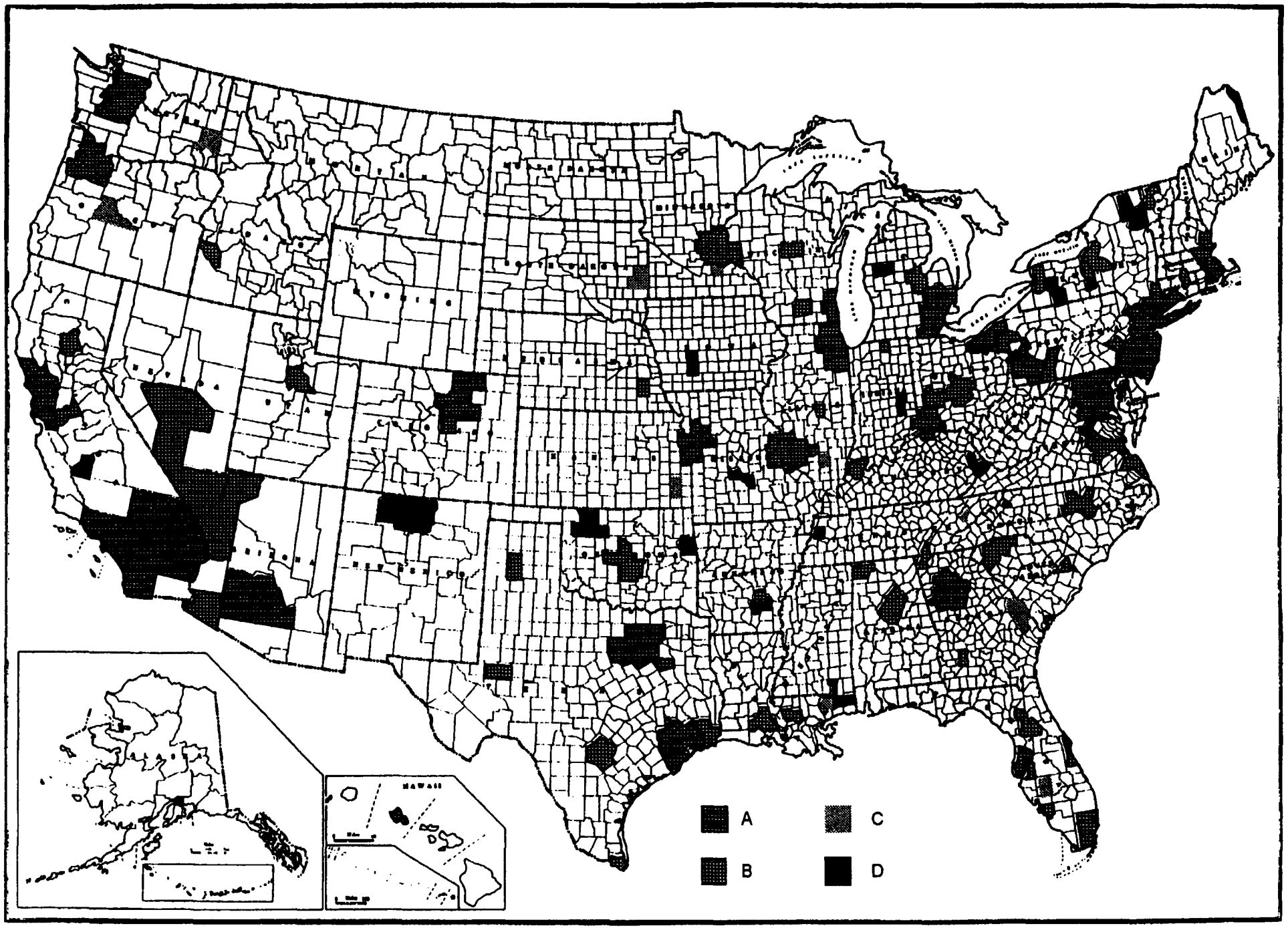
expenditure data provide the basis for establishing the classification and expenditure weights for classes of items included in the CPI. While the basic weights for the CPI are changed only about every ten years, the expenditure survey data are examined every year to adjust the selection probabilities of items in the CPI and to determine the number of price quotes to be assigned for collection, depending on the amounts of expenditures reported for different classes of items. That procedure allows BLS to account somewhat for changes in purchasing habits in the decade that usually passes between the major revisions in expenditure weights.

[7]The *C* and *D* PSU's are similar in that both are a mixture of rural and (non-metropolitan) urban areas. Indeed, BLS intended to make no distinction between the *C* and *D* PSU's. Those two types of PSU's originally comprised a larger group of PSU's selected for inclusion in a CPI that would cover the entire country, not just the urban areas. When budgetary considerations led to the decision not to expand the CPI to include rural areas, BLS retained a smaller set of PSU's--the *C* PSU's--for inclusion in the CPI-U. Excluded from the CPI-U are some PSU's that are purely rural and some that are a mix of rural and urban areas. These are the *D* PSU's. It should be noted that the *C* PSU's do not include any purely rural areas.

PSUs in the Consumer Expenditure Survey



Once the upcoming revision of the CPI has taken place, the food-at-home component of the CPI will include prices from the *A, B* and *C* PSU's. Households that will be covered by the rural food price index reside in the *C* and *D* PSU's. Consequently, the *C* and *D* PSU's are prime candidates in which to collect prices for a rural food-at-home price index. In all but one of the data collection systems proposed below, it will be possible to use price data collected by BLS in the urban portions of the *C* PSU's. Consequently, in the *C* PSU's, primary price collection will take place mostly in the rural areas whereas in the *D* PSU's, primary price data will be collected wherever rural households shop, in rural as well as urban outlets.

After BLS has determined the areas in which it is going to collect expenditure and price data for the CPI, it needs to ascertain which outlets within those areas should be visited by its price-collection staff. Thus, on behalf of BLS, Census conducts one more survey called a *Point-of-Purchase Survey* (POPS). The purpose of this survey (see Appendix 3 for details) is to ask households about the location of outlets (stores) in which they purchase specific groups of items. BLS then samples from this list of outlets to obtain a set of stores from which prices will be collected for the CPI. In contrast to the CES, it is important to note that the POPS does not encompass many rural households, such as those in *D* PSU's, that are intended to be covered by the rural food price index. Therefore, this type of survey will have to be conducted of rural households in any system for constructing a rural price index.

The third step in the construction of a price index is to conduct initial visits to the outlets selected from the POPS. This process, known as *outlet initiation*, serves two important purposes. First, it helps secure the cooperation of the store for future visits by field representatives. Second, the items in the store for which prices will be collected on a regular basis are chosen during this visit.[8] Prices of these items are also recorded at this time.

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[8]These items are chosen on a probabilistic basis with items purchased more frequently receiving a higher probability of selection. In outlets visited by both rural and urban households, it is possible that the consumption patterns of urban households may reduce the probability of selecting items favored by rural households for inclusion in the rural food price index. See the *Conceptual Assessment Report* for more detail on the item selection process.

After outlet initiation has been completed, step four in the construction of an index begins and prices are collected routinely from those outlets on a schedule dictated by the frequency of the index. During each visit, the objective is to collect prices for the same set of items selected during initiation. The gathering of reliable price data depends in a large way upon the training of field representatives and the proper initiation of outlets. For that reason, the BLS methodology is notable for the extensive two-stage training imparted to field representatives. Another notable aspect of BLS methodology is the use of *specification sheets*. The specification sheet is essentially a checklist covering a wide range of characteristics that could be used to describe an item being priced. Specification sheets are supplied by BLS to its field representatives for each of the most detailed categories of expenditures included in the CPI. These checklists are completed in detail during store initiation and help to ensure that the same item is priced during subsequent visits. BLS-type price collection systems proposed here call upon the use of BLS training and price collection procedures.

In the final stage, price data are sent to BLS headquarters in Washington where they are verified and aggregated into a price index. In this report, the term *verification* refers to a process whereby the price data that BLS receives at headquarters in Washington are analyzed to identify those that do not appear sensible and need further examination. For example, there could be large differences among price quotes for the same item or the prices for some items could be very different from those reported the previous time. For a price that does not appear sensible, BLS verifies whether or not an error has been made in recording it. Some of the verification procedures simply determine whether the price is subject to sharp seasonal fluctuations. Other procedures include asking BLS field offices to recheck the price. In the BLS-type collection systems described later in this report, field checks would be the responsibility of the organization that is doing the price collection.

III.B.2. Methodological Aspects of BLS-Type Price Collection Systems

All but one of the proposed hypothetical data collection systems are based on the BLS methodology. BLS-type systems will all lead to a rural food price index that can be compared directly to the urban food-at-home component of the CPI. As previously mentioned, the

consumer expenditure survey as currently conducted by Census is an adequate source of data on the expenditure patterns of rural households. Therefore, the hypothetical data collection systems need not replicate this step in the construction of the rural price index. But the remaining steps in index computation--the point-of-purchase survey, outlet initiation, price collection, and index compilation--need to be analyzed because the systematic collection of food prices in outlets where rural households shop has no precedent.

Collecting food prices for the rural index using BLS methodology raises several issues that affect the cost and analytical content of the resulting index. These issues are as follows:

1. Household survey of shopping patterns (POPS):

   A. In what number of nonmetropolitan areas currently on the Census' PSU list will price data be collected?

   B. Should nonmetropolitan areas be added to the current list of PSU's sampled by Census?

2. The number of categories of food needed to produce the rural price index and level of detail that needs to be publishable;

3. Number of outlet and price quotes needed per category of food expenditures;

4. Frequency of price collection and index calculation.

The issues raised above are common to all BLS-type data collection systems and the resolution of these issues will also be shared by all systems. Each issue is elaborated on in turn below.

1. The POPS

The first issue is the number and location of rural areas in which a survey of household shopping patterns should be conducted. Where the survey occurs will determine where prices will be collected for the rural food price index. In one scenario, a POPS could be conducted in all 28 non-metropolitan PSU's now in the CES, and food price data collected in all 28. In another scenario, the POPS could be conducted in a sub-sample of those 28 PSU's and prices

collected in that subset. In a third alternative, the rural POPS could, in addition to a subset of the 28 PSU's, include other PSU's not now in the CES.[9] Cost estimates will be provided below for a range of possibilities.

Once the POPS is conducted in rural areas, its importance extends beyond just being used to select the outlets at which food prices are collected for the rural food price index. The POPS may reveal that the bulk of shopping for food by rural households is actually at outlets in urban places. In that case, there may be no need to collect prices in rural areas and a rural food price index could be constructed using existing BLS price data for the *C* PSU's. The rural food price index so compiled may still differ from the food-at-home CPI for the *C* PSU's if, in comparison to urban households, rural households buy food items in relatively different quantities. If rural and urban households are alike with respect to the items they buy and where they buy them, the two indexes will behave identically and there may be no need to compile the rural food price index.[10]

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[9]Since the number of non-metropolitan PSU's is well below the number of states in the U.S., it is inevitable that several states will be left out of the pricing exercise. This does not compromise the representativeness of the rural food price index but, for policy reasons, it is possible that it is desired some states not currently playing host to a *C* or a *D* PSU be included in the collection of prices in rural areas. That objective could be achieved by taking another "draw" of *C* and *D* PSU's by removing some from the current list and including some new ones.

[10]Suppose that consumption patterns are found to differ across rural and urban households. That possibility adds an interesting dimension to the comparison between the rural and urban food price indexes. In footnote 3, it was noted that the CPI is an approximation to the "true" change in the cost of living faced by households. Economists have long been concerned with the issue of how well changes in the CPI compare with changes in the true cost of living. Once a rural food price index has been constructed, one could pose the following question: How well do changes in the rural food price index approximate the true changes in food costs faced by rural households? The answer to this question may not be the same as that for a corresponding question posed with respect to the urban food price index.

2. Number of Categories of Food to be Included in the Index

The CPI has five major expenditure categories for food at home. They are as follows:

Cereal and Bakery Products
Meats, Poultry, Fish and Eggs
Dairy Products
Fruits and Vegetables
Other food at home

Those categories are sub-divided further into approximately fifty expenditure categories which are all represented in the published CPI at the present time. One of the issues for the rural food price index is the level of detail on food categories that will be presented when the index is published. The level of detail depends on USDA requirements. But factors entering into the decision include providing users enough detail to understand the sources of differences between the CPI and the rural food price index and to establish a necessary level of credibility in the rural price collection methodology. The level of detail that is eventually published will also depend on choices made with respect to other methodological issues discussed in this section as well as the statistical properties of the data collected for the rural food price index.

3. Number of Price Quotes Needed Per Category of Food Expenditures

The number of price quotes per category of food expenditures needed for publication status is uncertain at this time. The answer depends upon factors such as the number of PSU's that are selected for pricing, the number of outlets located in those PSU's, and the observed variance of food prices. Assuming that one-half of the 28 *C* and *D* PSU's are selected for pricing, BLS is confident that its normal methodological procedures will yield a sufficient number of price quotes for publication of the rural food-at-home index at the aggregate level.[11] If the variance of prices is low, publication at a more detailed level, say for the five major categories listed above, may be possible. Publication at the detailed level may also be

[11]For the upcoming CPI revision, BLS plans to collect price quotes from four outlets for each POPS expenditure category in each PSU. The four outlets are randomly selected for each category. POPS currently has 49 categories of food expenditures. For some seasonal products more than one price quote will be collected per outlet.

made possible by increasing the number of PSU's in the pricing sample, by increasing the number of outlets or by gathering more price quotes per category of food expenditures than are normally obtained by BLS for the CPI. Because of the limited number of outlets in rural areas, only the first and third options may be feasible, while cost considerations suggest the third option as being the most feasible.

4. Frequency of Price Collection and Index Calculation

The final element to consider for the hypothetical data collection systems is the number of times in a year price data will be collected and an index calculated. There are three possibilities under consideration. One is monthly price collection and index calculation, a second is bi-monthly, and the third is quarterly. An advantage of monthly and bi-monthly price collection is that those procedures can be easily incorporated by BLS into its standard operating practices in the event that BLS is involved in the construction of the rural food price index. Price collection and index calculation on a quarterly basis may be a less costly alternative, but it will make it more difficult to integrate the work with BLS operations for the CPI.

III.B.3. Price Collection Using Scanner Technologies

The scanner data collection system will have to undertake many of the steps required of the

equipment. For outlets with scanner equipment, the scanner company could make arrangements to gather the requisite price data. However, the other stores will require personal visits for price collection and this may be fairly expensive.

A further limitation of scanner data is that about 30 percent of food-item purchases are not adequately scanned for price index purposes. These are items such as fresh fruits, vegetables, meats, chicken and fish. The lack of adequate price data on these items in scanner data bases can only be overcome by personal visits to the stores.

Finally, the scanner alternative requires that an urban food price index be produced as well as a rural food price index. That is because there may be some systematic (nonrandom) reasons why the universe of households sampled by scanning companies differs from the BLS universe of households. It is also possible that indexes based on scanned prices produce results systematically different from those based on prices collected by BLS field representatives for reasons not yet understood or researched. For these reasons, a rural food price index compiled from scanner data may not be directly comparable to the food-at-home component of the CPI. In that case, a judgement about whether changes in food prices faced by rural and urban households are the same can only be made if an urban index is also computed from scanner data.

III.C. Organizational Structure

This section presents possible organizational structures for several hypothetical data collection systems for collecting prices for food items typically bought by rural households. Differences across systems arise because the four broadly defined operational elements in producing the rural price index can be accomplished by various configurations of organizations. The operational elements and organizational configurations are summarized in Table III-1 below.

III.C.1. BLS-Type Price Collection Systems

In each BLS-type system, BLS will conduct the basic training of price collection agents. That will ensure each system is using price collection methods comparable to those BLS uses for the CPI. The major difference between BLS-type alternatives is in the identity of the organization which collects prices. One principal alternative is for BLS to do the actual price collection. The second is for other organizations to do the price collection. Under the second alternative, an interface will have to be established between the organization doing the price collection and BLS. Also, for that second alternative, a number of underlying assumptions have been made. One is that, as noted, the field representatives who collect prices will be trained by BLS in its collection techniques. The second is that BLS will do the necessary data review and index computation using the price data collected. The final one is that BLS and the other organization will confer about the scheduling of the price surveys and when the data should be delivered to BLS.

TABLE III-1
Comparison of Hypothetical Data Collection Systems

			Operational Elements			
Alternatives	**Food Price Index Coverage**	**Methodology**	**Point-of-Purchase survey**	**Training**	**Initiation and Price Collection**	**Data Verification and Index Calculation**
BLS	Rural HHDs	BLS	Census/PC	BLS	BLS	BLS
BLS/NASS	Rural HHDs	BLS	Census/PC	BLS	NASS	BLS
BLS/PC (small staff)	Rural HHDs	BLS	Census/PC	BLS	PC Small Staff	BLS
BLS/PC (large staff)	Rural HHDs	BLS	Census/PC	BLS	PC Large Staff	BLS
SCANNER	Rural and Urban HHDs*	To be developed	Scanner company	Scanner company	Electronically and staff	Private contractor

*May be limited to scannable food items only.

BLS: Bureau of Labor Statistics
NASS: National Agricultural Statistical Service
PC: Private contractor
HHDs: Households

The operational tasks that have to be completed for a BLS-type price collection system can be decomposed as follows into three primary tasks, with the third task comprising several sub-tasks that may be performed by different agencies.

1. Conducting the POPS;
2. Training of field representatives and review of data and index computation;
3. Doing the price survey:

    a. Recruiting/supervision of field representatives;
    b. Sending field representatives to BLS training;
    c. Provision for travel to PSU's;
    d. Initiation of outlets;
    e. Routine price collection.

The organization that will perform Task 1, which is the POPS, can be Census or a private contractor. Whichever agency conducts the POPS will be responsible for all of the tasks associated with that survey. Task 2 will be the responsibility of BLS, while Task 3 may be performed by BLS or some other organization. Below, several different organizations that can perform Task 3 will be discussed. The organization performing Task 3 would have the responsibility of recruiting and supervising the field personnel, of directing outlet initiation, of determining travel arrangements, and scheduling for the routine price collection.

The simplest organizational structure is the one in which BLS performs Task 3. In that case, USDA would simply contract with BLS to perform the entire process.

A second organizational structure would have another government statistical agency collect prices in rural areas. A candidate to do that is the NASS. The advantage of NASS is that it has an extensive field operation with the result that it has field representatives near the rural PSU's. The disadvantage is that there would be extensive training costs.

A third organizational structure would have a private company collect prices. In that scenario, there are two possible ways the private contractor could organize price collection. One way would be for a small number of field representatives to go from PSU to PSU to collect all of the price data. The second possible structure is for the private contractor to have a large number of field representatives situated across the country in or near the PSU's in which data are to be collected. The trade-off between the two methods is a training/travel trade-off. With a large number of field representatives, training becomes an appreciable cost element. On the other hand, with a small number of field representatives, travel becomes the appreciable cost element.

III.C.2. Scanner Systems

If scanner methods are used for collecting prices, the organizational structure would utilize personnel of the scanner company. Those personnel would carry out the POPS to choose the outlets at which prices will be collected. Then scanner personnel would collect the prices using scanner technology where possible or conventional methods for outlets without scanner equipment.

The computation of the index would most likely have to be contracted out to a private contractor, however. That is because most scanner companies are not set up to compute price indexes. A private contractor would have to be used because the government agency that is most suitable to do it, BLS, would find it difficult to fit the scanner data into its normal price index computation procedures. In addition, it should be recalled that since an urban price index would have to be computed, BLS would have to produce duplicative indexes, its own CPI and an urban index using the scanner data.

III.D. Components of Cost

The components of costs will be analyzed in the sections below by considering the operational elements described in Table III-1. To a large extent, those elements determine the size of the personnel staff required for price collection under any given organizational structure. The organizational structure determines how the personnel are chosen and trained, and then

how they are scheduled. Sections IV-VII describe various options for organizing the staff. Budgetary factors are summarized as well in those sections. Appendixes 3-7 provide details on how the budgetary factors were derived.

IV. THE BLS ALTERNATIVE

IV.A. Summary Description of BLS Alternative

One way to compare the behavior of food prices paid by rural households to the behavior of prices paid by urban households is to follow exactly BLS methods when constructing the rural food price index. That allows the rural price index to be directly comparable to the CPI for food at home without the methods for producing the index being a factor in the comparison. The most straightforward way of following BLS' methods would be to contract the work to BLS. That would be feasible because BLS is interested in doing the work, and if BLS were to produce the rural food-at-home index, its methods, procedures and trained personnel would be used.

The use of BLS methods is the concept behind the hypothetical "benchmark" system referred to as the *BLS alternative*. Nonetheless, as good as that benchmark will be, the rural food price index produced in this alternative can still have more variance than the CPI for food at home. That is because the rural food price index will have fewer quotes insofar as it will represent only about 14 percent of U.S. households as compared with the 86 percent included in the scope of the present CPI.

The way the BLS alternative is envisioned is for the tasks associated with the rural food price index calculation to become an adjunct to the CPI price collection program. Hence, BLS will perform all of the major duties listed in Section III.A., with the exception of the POPS survey requesting information about the outlets in which rural households shop. That survey will be conducted by Census or by a private contractor.

BLS' responsibilities will include recruiting and supervising the staff necessary for collecting the prices used in a rural food index. BLS would use its own field representatives to collect prices for the rural index. Thus, they would be the same field representatives who are engaged in collecting prices for the CPI. Because of that, training of those individuals will

be a part of BLS' regular CPI program and will not be a factor in the cost estimates. For this alternative, training costs are assumed to be zero.

Initiation and routine price collection for the rural index would follow BLS methods and procedures. Its methods would also be used to handle situations where the items being priced disappear or the outlets themselves disappear. The price collection tasks would be part of a broader job requiring the same set of skills BLS field representatives use in collecting prices for the CPI price collection. Moreover, the BLS field representatives who collect prices for the rural index will use the same item specifications and forms (and/or computer programs) currently used for the CPI price collection. Hence, when the rural prices that BLS collects arrive at BLS' Washington office, they will have been collected in the same way and be in the same format as standard CPI food price data.

By being in the same format as CPI prices, the prices collected in rural areas can be merged easily into the price verification and index calculation system BLS has in place for calculating the CPI. That will ensure that the verification rules used for the CPI food-at-home index will also be used for the rural food price index. Then, after the data have been checked and verified, the same computer programs BLS uses to calculate the CPI food index can be used to calculate the final rural food price index. That method will result in the rural and urban food price indexes being methodologically comparable. What differences remain--if any--will be due to substantive causes, and not to the methodology of price collection and index computation.

In contracting out the price collection to BLS, a factor that has come up in discussions with BLS is the upcoming revision of the CPI. The discussions have centered around whether the staff resources available to BLS are stretched thin because of the revision. The plausible time-line for the development of the rural index is, however, likely to be such that there would be almost no call on BLS resources until most of the revision has been completed. The most optimistic scenario for beginning the rural food price index assumes that a rural POPS would be conducted no earlier that 1997. In that case, the earliest a price survey could be conducted

is 1998. But, by that time, most of the revision activity should have been completed. That would allow BLS to allocate resources to collecting prices in rural areas. More than likely, though, the rural POPS would not be conducted until 1998. That means that the earliest a price survey could be conducted is 1999. By then BLS should certainly be able to allocate the resources needed for price collection in rural areas.

IV.B. Organizational and Operational Factors

Under the BLS alternative, organizational control of producing the index would be totally in the hands of BLS. BLS would undertake all of the coordination and responsibility for: 1) the recruiting, supervision and training of field representatives; 2) the initiation of stores for price collection and the periodic visits by field representatives to collect prices for the rural food price index; and 3) the review of the data and the index compilation.

The feasibility of the alternative is based on the use of BLS personnel who would otherwise be collecting prices in the *A*, *B* and *C* PSU's. One reason it is considered feasible to use BLS field representatives to perform the price collection for the rural food price index is that the BLS field representatives are not employed full-time. Currently, BLS field representatives work approximately 30-40 percent of a full-time schedule for routine CPI price collection. Assuming those representatives want additional work, they should be able to devote the approximate 2-3 additional days needed for the collection of rural food prices, especially if the collection frequency of those prices is less than monthly. Moreover, the price collection for the rural food price index could be scheduled so as to take advantage of the less busy parts of the CPI price collection schedule.

An alternative would be for BLS to hire and train entirely new personnel to do the rural food pricing. But for the few days a month required to do the price collection for the rural index, it is probably more cost effective to use the same field representatives who collect prices for the CPI.

Another reason it is considered feasible to use BLS personnel is based on the assumption that the PSU's selected for the rural food price index are only from the *C* and *D* non-metropolitan PSU's described in Section III. For the *C* PSU's in the USDA's sample, BLS already has personnel there and no travel will be involved to get to those PSU's. BLS field representatives will be in those PSU's because they will be collecting prices from the area for use in the CPI. For those field representatives, it should be a relatively minor extension of their duties to collect any additional prices needed for the rural index in the same area. On the other hand, for the *D* PSU's in the sample, field representatives will have to travel from the nearest *A*, *B* or *C* PSU to collect prices. As can be seen from the map in Section III, though, most of the *D* PSU's can be easily reached from a PSU where BLS field representatives already reside. In general, most PSU's are no more than one and one-half hours by auto from a nearby *A*, *B* or *C* PSU. Only four *D* PSU's will require air travel to reach. It should be noted that even if rural areas besides the *C* and *D* PSU's on the map are selected for pricing, it should still be feasible to use BLS personnel to collect prices, although a plane trip would probably be required.

The absence of travel costs for the *C* PSU's reduces the cost of collecting prices in those PSU's. It will be reduced further because some of the same outlets at which prices will be collected for the CPI will also be the same outlets at which prices will be collected for the rural index. Because of that overlap, there will be no need to collect prices in those outlets for the rural index. The prices collected for the CPI would be used for the rural index albeit with different weights.

IV.C. Budgetary Factors

An estimate of the cost elements for a budget of a BLS-only collection system is presented at the end of this section. JPC has developed cost estimates for a budget of a BLS-only collection system which are presented in this report. The budget is for varying numbers of PSU's for different price collection frequencies. These estimates were derived from data supplied by BLS. Nevertheless, the estimates are rough, and intended only to help USDA

evaluate the alternatives presented in this study. They cannot be treated as an accurate measure of final costs which can only be made with a complete design specification. Accordingly, they are not binding on BLS and should not be used for budget submissions. The methodology for estimating the budgetary factors is described in Appendixes 4 and 5. A high and low estimate of travel costs is presented in Appendix 5 as well. The estimates presented here do not take into account the fact that CPI price data are available in the *C* PSU's.

IV.C.1. POPS Cost

The budgetary factors include three estimates of the *POPS* cost for three different PSU configurations. The PSU configurations range from a maximum of 28 to a minimum of 10. The 28 PSU configuration corresponds to the total number of *C* and *D* PSU's (see Section III). The 10 PSU configuration would produce at best an experimental non-publishable index. The 14 PSU configuration was arrived at in consultation with BLS. BLS recommended that number as one that would be adequate to yield an index publishable at the food-at-home level and possibly at a more disaggregated level.[12]

For each PSU configuration, three POPS cost estimates were completed. One was based on the cost of a Census computer aided telephone interview (CATI). The other two were based on CATI costs of private contractors. For the Census costs, a range is given because of uncertainty about the final costs for a food-only POPS. For one private contractor, the POPS cost includes oversampling to be able to separate out urban and rural households within PSU's that include both.

As more experience is gained by the organization doing the POPS, costs for the survey may go down somewhat. Nonetheless, the ongoing POPS cost will continue to be substantial. That is because of two factors. One is the upcoming change in BLS sampling methods; and the other is the near invariance of sampling costs to the number of questions asked. The upcoming

[12]For the 14 PSU configuration BLS has suggested choosing four PSU's from the west, four for the north-central, four from the south and two from the east.

change in BLS methods leads to a requirement that all PSU's be sampled each year so as to resample one-fourth of all POPS categories. Although the schedule for resampling those categories has yet to be determined, undoubtedly some of the categories to be resampled will be food categories. So the assumption in this report is that at least some food categories will be resampled every year. Consequently, *all* PSU's will have to be sampled every year. Sampling all PSU's means, though, that the same number of households will have to be interviewed each year for the POPS as will be interviewed initially. Separately, there is the second factor of the near invariance in sampling costs regardless of the number of questions asked. Hence, the cost for interviewing a household will be almost unchanged by the reduction in the number of POPS categories in subsequent years. Hence, with the same number of households and the same cost per household, continuing POPS costs will be substantial.

IV.C.2 Initiation Costs

The *initiation* costs are the costs for the first visit to the outlet when price collection begins. Two estimates of initiation costs have been provided. One is first year cost for a full initiation. The other is an ongoing cost. It assumes that 25 percent of items will be newly initiated each year, the same procedure BLS uses for the CPI. The initiation costs are invariant to the number of times prices are collected per year. On the other hand they are sensitive to the number of PSU's, and they are affected by the number of outlets in a PSU and the number of items selected per outlet. The initiation costs include travel costs to the PSU for initiation and the longer time spent on initiation. The note on the table shows travel costs separately and indicates what is included in travel costs. The estimate of travel costs takes advantage of the fact that reaching the *C* PSU's requires no travel.

IV.C.3. Routine Price Collection

Routine price collection costs are the actual costs of collecting the prices from the outlets sampled from the POPS. The routine price collection costs include travel costs to the PSU. For each configuration of PSU's, three estimates of routine price collection costs are presented, depending on the frequency of price collection. BLS has indicated that it could easily fit either

monthly or bimonthly frequencies into its production schedule. Fitting in a quarterly frequency would be much more difficult.

IV.C.4. Training and Management Costs

For the BLS alternative, training costs have not been estimated because they are expected to be minimal. That is because most of the training will be a part of BLS' standard CPI training program for its field representatives. Nonetheless, some training costs may be encountered if there are an insufficient number of field representatives who want additional work. One other cost not included is the management cost that BLS will need for including the rural food-at-home index in its operations.

IV.C.5. The Effect of the Number of Quotes on Costs

For the 14 PSU configuration, two cost estimates have been presented, both for the BLS alternative and for the other alternatives as well. One estimate assumes the standard number of quotes will be collected from each outlet while the other configuration assumes twice the standard number of quotes. The reason for estimating the cost for twice the number of quotes was based partly on recent work by BLS that showed that the variance of the CPI food-at-home index can be reduced by increasing the number of quotes regardless of how that number is increased. It was also based partly on the observation that the POPS cost is the most substantial cost element of price collection. Thus, by doubling the quotes per PSU and reducing the number of PSU's, substantial cost savings can be achieved with the expectation that the variance will be unaffected.

TABLE IV-1
COST ESTIMATES FOR BLS-ONLY PRICE COLLECTION SYSTEM

	NUMBER OF PSU's			
	28	14		10
	(thousand of dollars)			
	POPS COST			
Census	706-470	353-235		252-168
Private Contractor	314	156		112
Private Contractor	439	220		157
Number of Quotes (est.)	5900	2950	5900	2100
		A	B	
	INITIATION			
First Year	50	25	42	18
Additional Year	27	14	22	10
	ANNUAL COST OF ROUTINE PRICE COLLECTION			
Monthly	244	120	140	88
Bimonthly	122	60	70	44
Quarterly	82	40	47	30
	VERIFICATION AND COMPUTATION			
BLS (est.)				
Verification	109	109	109	109
Computation	6	6	6	6

Note: both the initiation and routine price collection costs above include the travel costs associated with those tasks. The travel costs are as follows:

	ADDENDUM: ANNUAL COST OF TRAVEL		
Number of PSU's:	**28**	**14**	**10**
Monthly:	70	35	26
Bimonthly:	35	18	13
Quarterly	23	12	9

Travel figures include auto, plane, per diem & hotel, and labor costs (wages + fringes) for time in-transit; no supervisory or headquarters overheads are included in travel costs.

V. THE BLS/NASS AND ERS ALTERNATIVE

V.A. Summary Description of the BLS/NASS and ERS Alternative

NASS conducts surveys and collects data related to agricultural and rural statistics. It maintains forty-five field offices distributed in every state except in New England, where it has one field office in New Hampshire covering the six New England states. Within each field office, NASS maintains several supervisors who are responsible for various areas of work. Each supervisor coordinates a set of field representatives (which NASS calls interviewers). Those field representatives can be assigned to conduct routine or special surveys in the state.

The NASS alternative would entail having NASS field representatives collect prices from the rural PSU's on a regular basis (for example, bimonthly). According to NASS, it would plan to assign one representative to a PSU to collect price data. BLS or some other organization would then provide it with a listing of the outlets from which prices would be collected for each of the PSU's.

To ensure that the rural food price index resulting from the prices collected by NASS representatives will be comparable to the CPI food-at-home index, BLS methods and procedures would have to be followed. Hence, representatives assigned by NASS would be provided training by BLS comparable to that provided by BLS to its own field representatives. (To be determined is whether the NASS supervisors need to go for the full period of training.) BLS would also supply NASS with the specification sheets or checklists containing a description of the food items and with other collection materials as needed. It would also provide NASS with all updates to reference materials, changes in specifications and procedures and overall pricing schedules. That will keep NASS' price collection procedures up-to-date and synchronized with the price collection BLS is doing for the CPI food-at-home index.

Under NASS' standard procedures, the field office supervisor initially accompanies the field representative as the field work gets under way. Subsequently, the supervisor would do that

at occasional intervals. The supervisor would coordinate the field representative's assignments. The supervisor would also act as a backup for the field representative.

The initiation of outlets and the routine collection of prices would be built into the regular survey assignments of field staff. Because of the location of field offices in each state, the collection for the PSU's would be carried out through the respective field offices. The field office would assign the field staff who would cover the PSU. It would then collect the completed checklists and send them to a central location (one field office) for data entry. The electronic

files of the price data would then be sent to BLS for verification, checking, and analysis. If BLS wanted to build in some initial data edit into this process, NASS could accommodate that in the data entry. Alternatively, NASS could forward the original paper checklists directly to BLS.

Most of the process outlined is likely to be implemented and coordinated through BLS and NASS. The major exception is the POPS to identify the outlets. That would be carried out by Census or a private organization.

Once the POPS was completed, NASS field representatives would initiate the prices and items at the outlets. It would then collect the prices at regular intervals using BLS procedures. By using the same checklists (and/or computer programs) that BLS uses, NASS field representatives will collect prices the same as do BLS field representatives. Thus, when NASS sends its price data to BLS' Washington office, the data will be in the same form in which all CPI data arrive. Consequently, the data will be in a format that can be easily merged into BLS' CPI system. Furthermore, they will undergo the same set of verification procedures as other data used in the CPI. BLS (and/or NASS) would then have to verify the data and to construct the food price index for rural areas. After BLS has verified the data, they then will be put through the same calculation procedures as data used for the food-at-home CPI, and will then compute the food price index for rural households.

The Economic Research Service (ERS) was queried about whether it currently does any construction of price indexes from raw price data. The response was that it does not. Instead, it uses the BLS constructed indexes. The procedure is that BLS provides the detailed food item price indexes to ERS, and ERS uses that information both in the construction of reports it issues and in the projections of future food price changes.[13]

V.B. Organizational and Operational Factors

The basic information on NASS and NASS' operations was provided by Robin Roark. He works in the Commodity Surveys Section and with the national survey administration unit. His office is responsible for coordinating the logistics of NASS surveys and for coordinating all outside requests.

According to information provided by NASS, it maintains field staffs, organized in state field offices to conduct surveys in agricultural and rural areas. Currently its operations cover all of the counties of the 28 non-metropolitan *C* and *D* PSU's. Its field staffs are relatively stable and maintain relatively constant workloads. The current staffs are likely to have the available time to add survey work of the type proposed.

For special or non-recurring surveys, NASS may add temporary staff either in the state office or in the field. The ongoing nature of the rural price collection would, however, be built into its regular staff operations and would not be viewed as "temporary." NASS anticipates work on the order of 2-4 days per month, once the price collection work gets underway.

One potential concern was the effect on NASS if, as is anticipated, NASS assumes responsibility for the Census of Agriculture. The Census of Agriculture, which is run once every five years, is next scheduled for Spring 1998. The NASS staff person who was

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[13]Annette Clausen is the individual in the Food Markets Branch of the Food and Consumer Economics Division who specifically uses the price index information from BLS. She assembles the food price numbers used within ERS and uses the BLS data for analysis.

contacted (Robin Roark) thought that the Census of Agriculture work would not present a problem for the rural food price collection work. That is because the Agricultural Census is primarily a mail survey and would be handled by adding temporary staff in the state offices.

Another issue was NASS' experience with computer assisted personal interview devices. The NASS field enumerators have had some experience with such devices. If BLS changes to computer assisted data collection procedures, as it is expected to do over the next several years, NASS staff have the experience to accommodate that change.

The need for NASS to maintain comparability of data collection procedures would require relatively close coordination between it and BLS. For example, it is conceivable that there would be some overlap between the stores for the urban and rural indexes if urban and rural households both shopped at the same places. To reduce the burden on those stores, that sort of overlap would need to be addressed by coordinating BLS and private contractor price collection.

V.C. Budgetary Factors

NASS worked with the information that was provided to it about the number of outlets and PSU's and quotes. The budgetary factors it provided can be found in Appendix 6. The cost estimates NASS provided are for price collection in 28 PSU's on a bimonthly basis. Additional cost estimates were then made from those estimates for other components to make cost estimates for configurations resembling the ones presented for the BLS-only alternative. How that was done also can be found in Appendix 6. The cost estimates are intended to be comparable to those of the BLS alternative.

The POPS costs for NASS are the same as for BLS insofar as they do not depend on NASS; and, as with the BLS-only system, the POPS costs will be ongoing. As for the training and initiation costs, those have been presented jointly because NASS did not supply separate figures for them. Also, the training costs do not include BLS charges for training. Insufficient information was available to derive BLS charges for training. The element labelled "USDA

travel costs" covers charges to USDA for travel and per diem. It is based on the assumption that all trainees come to Washington for training. It should also be noted that NASS only assumed eighty hours of training and that may be too low. (See especially Appendix 4.)

TABLE V-1
COST ESTIMATES FOR BLS/NASS PRICE COLLECTION SYSTEM

	NUMBER OF PSU's			
	28	**14**		**10**
		(thousand of dollars)		
		POPS COST		
Census	706-470	353-235		252-168
Private Contractor	314	157		112
Private Contractor	439	220		157
Number of quotes (est.)	5900	2900	5900	2100
		A	**B**	
		TRAINING & INITIATION		
First Year (est.)	32	16	27	11
Additional Year	18	9	14	6
USDA travel costs for training				
First Year	112	56	56	40
Additional Year	22	11	11	8
		ANNUAL COST OF ROUTINE PRICE COLLECTION		
Monthly	150	75	88	54
Bimonthly	75	38	44	27
Quarterly	50	25	35	18
		VERIFICATION AND COMPUTATION		
BLS (est.)				
Verification	109	109	109	109
Computation	6	6	6	6

Note: NASS' estimate of training did not include travel costs to Washington. Those costs are entered in the line item termed "USDA travel costs for training." Also the training costs do not include any BLS charges for training.

VI. THE COMBINATION BLS/PRIVATE CONTRACTOR ALTERNATIVE

VI.A. Summary Description of the BLS/Private Contractor Alternative

The hypothetical data collection system referred to as the combination BLS/private contractor alternative is based on the concept that the tasks necessary for calculating a rural food price index would be divided between BLS and a private organization. The personnel training, price verification and index calculation tasks of the rural food price index calculation would be contracted to BLS. The recruiting of field representatives and the price collection tasks (including store initiation) would be contracted to a private organization.

The way this alternative is envisioned, USDA would contract with a private organization to recruit field representatives who would do the price collection for the rural index. The private organization alternative could follow one of two main models: 1) a large geographically dispersed staff model; or 2) a small dedicated staff model.

Under the large-staff model, price collection could take place nearly simultaneously in all of the areas where prices are being collected for the rural food price index or it could be staggered. Under the small-staff model, price collection for the different areas would have to be staggered to allow a relatively small group of field representatives to travel from area to area to collect all the prices needed.

To ensure that the rural food price index resulting from either of those two price collection processes is comparable to the CPI food-at-home index, BLS methods and procedures would have to be followed. BLS would provide training on food price collection to the private organization's field representatives that is comparable to that provided to its own field representatives. BLS would also provide the private organization with all updates to reference materials, changes in food item specifications and procedures, and overall pricing schedules. That would keep the private organization's price collection procedures up-to-date and synchronized with the price collection BLS is doing for the CPI food-at-home index.

The private organization would also need to create a system to convert the price information collected by their field representatives to a form that could be entered easily into BLS' data verification system for the CPI. Once BLS had the data, it would use the same set of verification procedures on the prices as it uses for the CPI food-at-home data and then calculate the rural food price index.

VI.B. Organizational and Operational Factors

VI.B.1. Scheduling

Under this alternative, BLS would have the responsibility for the overall pricing schedule in that it would determine when price collection needed to take place in order to meet USDA's timeframe for index publication. The private contractor would have the responsibility for scheduling all travel, etc. to see that the price data can be forwarded to BLS on schedule.

VI.B.2. Recruiting

The private organization would have all the responsibility for recruiting an appropriate number of field representatives to conduct the price collection on the schedule determined by BLS. The number of field representatives needed would depend on the number of areas in which price collection would take place, the frequency of the price collection and the structure of the organization itself.

The large-staff model would be good for an organization whose employees are geographically dispersed and are working on several different types of tasks for the private organization. Employees that are in geographical areas near where the rural price collection will occur would be trained to follow BLS methods and procedures. Then, when price collection is required, each would be sent to one of the areas to collect prices. Under that scenario, price collection in all of the rural areas could be undertaken virtually simultaneously.

The small-staff option would be more appropriate for a private organization whose employees are very localized and who do not reside near the rural price collection areas. The private organization would assign a small group of employees to travel from one price

collection area to another to collect the prices needed for the rural food price index. Unlike the large-staff alternative, which would make price collection a periodic task in a broader range of tasks that a large group of employees does, the small-staff would make price collection a more nearly full-time dedicated task for a small group of employees.

VI.B.3. Training

Under either the small or large-staff model, the private organization would have the responsibility of ensuring that its field representatives were fully versed in BLS methods and procedures and had completed all of the required BLS training. Hence, the training of the private organization's field representatives would have to be done by BLS and would have to be the same training that BLS provides its field representatives. That will ensure comparability of price collection in rural areas with collection for food-at-home prices used in the CPI. (As with the NASS alternatives, insufficient information was available to derive BLS charges for training.)

Logistically there may be one problem with the large-staff model and BLS training. Over the next few years, BLS will be retraining all of its staff to handle changes in procedures that will result from the revision to the CPI and a change to computer-assisted data collection. That increases the burden on BLS' training staff significantly. Consequently, they may not have the resources to train a large number of private organization field representatives in addition to retraining their own field representatives. The extent to which that affects rural price collection will depend on when USDA would like rural price collection to begin.

VI.B.4. Store Initiation, Price Collection, Data Verification and Calculation

Store initiation, price collection and conversion of price information to a format compatible with BLS' data verification systems would be the responsibility of the private organization. Data verification and index calculation would be the responsibility of BLS.

VI.B.5. Issues Concerning Operational Procedures

The most complicated operational procedures would be those associated with price collection. However, depending on whether the contractor uses a small-staff model or a large-staff model, those procedures could have an effect on BLS procedures as well.

The large-staff model is the one that would be most like BLS' own operating methods for the CPI. Because there are many geographically dispersed field representatives under this model, price collection would take place in all the rural pricing areas nearly simultaneously. That would allow all of the data for the index to be forwarded to BLS at one time and the data verification and index calculation could be done sequentially.

The small-staff model would require slightly different operational procedures. Under that option, the price data could not be collected simultaneously from all of the rural pricing areas. The frequency of the index calculation and the number of areas in which prices for the rural index will be collected will determine the number of field representatives needed and how many areas each will be visiting. However, it is possible that several batches of data would be sent to BLS for verification (a task that needs to be done as close to price collection as possible) before the index calculation is done. BLS will be able to handle data sent in batches without a problem if the frequency is monthly or bimonthly. There is some uncertainty about that if the frequency is quarterly.

Regardless of which model is followed, the need to maintain the comparability of data collection procedures would require relatively close coordination between BLS and the private organization. For example, it is conceivable that there would be some overlap between the stores for the urban and rural indexes if urban and rural households both shopped at the same places. To reduce the burden on those stores, that sort of overlap would need to be addressed by coordinating BLS and private contractor price collection.

VI.C. Budgetary Factors

Table VI-1 presents the budgetary factors for the private contractor alternative for both the large-staff and small-staff variants of that alternative. Some of the costs in the table were not supplied by the private organization. They were based on estimates developed for this study. See Appendixes 4 and 7 for how various cost elements were derived. The training costs in Table VI-1 do not include BLS charges for training. The costs in the table are intended to be comparable to the costs of the BLS alternative.

In comparing the two models, what becomes apparent is the expense of the small-staff model. That arises from the expense of air travel. Offsetting that expense is the extra experience that will be accumulated by the small number of individuals who will be doing the price collection in comparison with the staff of the large-staff model where each field representative will be collecting prices only a few days a month at best. The continuing experience of the field representatives of the small-staff model as well as the constant use of the same individuals to collect the prices, ensures that the same procedures will be followed consistently during each price collection. While those characteristics do not guarantee that results from the small-staff model will precisely match those of the BLS, they should, nevertheless, be expected to produce results that are more nearly comparable.

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TABLE VI-1
COST ESTIMATES FOR BLS/PRIVATE CONTRACTOR PRICE COLLECTION SYSTEM

	NUMBER OF PSU's			
	28	14		10
	(thousand of dollars)			
	POPS COST			
Census	706-470	353-238		252-168
Private Contractor	314	179		112
Private Contractor	439	220		157
Number of Quotes	5900	2950	5900	2100
	Large-staff Model			
	TRAINING			
First Year	164	82		59
Additional Year	32	16		12
BLS Cost for Training				
First Year	--	--		--
Additional Year	--	--		--
	INITIATION			
First Year	56	28	47	20
Additional Year	30	17	25	11
	Small-staff Model			
	TRAINING & INITIATION			
First Year	144	101	170	90
Additional Year	70	57	89	49
	ANNUAL COST OF ROUTINE PRICE COLLECTION			
	Monthly			
Large-staff Model	336	192	168	120
Small-staff Model	780	420	368	288
	Bimonthly			
Large-staff Model	168	84	98	60
Small-staff Model	390	184	215	144
	Quarterly			
Large-staff Model	112	56	65	40
Small-staff Model	240	132	143	107
	VERIFICATION AND COMPUTATION			
BLS Cost	109	55	109	39

Note: BLS Cost does not include any charges BLS may require for training outside personnel.

VII. THE SCANNER ALTERNATIVE

VII.A. Summary Description of the Scanner Alternative

The hypothetical data collection system referred to as the *scanner alternative* is based on the concept that all tasks except index calculation would be the responsibility of a company (hereinafter referred to as the scanner company) collecting retail price information from scanner terminals in retail outlets. The personnel training and price verification would be carried out by the scanner company. The recruiting of field representatives and the price collection tasks (including store initiation) would be the responsibility of the scanner company. Additionally, the scanner company would have to run its own POPS from its household data base. The POPS would move the scanner company towards using its scanning data base in a manner consistent with scientific sampling. Finally, an organization other than BLS would do the price index computation.

The way this alternative is envisioned, USDA would contract with a scanner company that collects sales and price information using scanners. Because such companies do extensive market research, they generally have two data bases. One contains information about household buying patterns. The other has information from retail outlets, including price data, that comes from the scanning systems. From the household data base, the scanner company would conduct a POPS. The POPS would lead to the selection of outlets at which prices will be collected. Some of the outlets selected will be in the scanner company's data base or in samples in place, while other outlets will not be. For outlets in its data base, price data will come electronically right off the data tapes supplied by the outlets to the scanner company. For the outlets not in the data base, but which have scanning equipment and which give the scanner company permission to read their data tapes, the data could also be transferred electronically. For other outlets, the scanner company will have to use field representatives to collect prices. It could do that by using its existing staff or by expanding its staff of field representatives. Some cost savings on price collection for outlets not in the data base could be effected by having the scanner company substitute comparable outlets in its data base for outlets not in the data base. Comparable outlets would be those of the same size in terms of

dollar volume and selling to the same individuals having comparable characteristics. That may prove to be difficult insofar as only 10 percent of supermarkets are in the scanner company's data base.

Two factors stand out about the scanner alternative as compared with other alternatives. The first is that the scanner company's price collection methods will be very different from BLS' collection methods. The second is that the scanner company's household data base is configured very differently from Census' data (which is by PSU). One consequence is that there is no assurance that a rural food price index based on prices collected using scanner techniques can be compared to the CPI for food at home. Thus, to be able to answer the question posed in Section II, about how a rural food price index moves with regard to an urban price index for food, an urban food price index would also have to be computed from prices collected using scanner techniques.

VII.B. Organizational and Operational Factors

VII.B.1. Scheduling, Recruiting, Training, Store Initiation, Price Collection, Data Verification and Calculation

Under this alternative, the scanner company would have the responsibility for determining and scheduling price collection. It would determine when price collection needs to take place in order to meet USDA's timeframe for index publication. It would also have the responsibility for scheduling all travel and data collection. Finally, it would have all the responsibility for recruiting an appropriate number of field representatives.

For outlets without scanning equipment, there would need to be an initiation comparable to the kind used when BLS-type procedures are followed. Similarly, for those outlets, the price collection and data verification procedures used by the scanner company would probably have to follow BLS procedures (although the scanner company could choose to follow its own unique procedures in those cases). For outlets in the scanner company's data base, or outlets not in the data base but with scanning equipment and which agree to share electronic data with

the scanner company, initiation and price collection could be carried out electronically. Although these two approaches are somewhat different, they emulate the BLS spirit of using the best data available when initiating outlets.

Not all items are scanned in a supermarket. In particular, items whose weight and size are not uniform, such as fresh meats and produce, are not in the scanner company's data base. For those items, the scanner company sends field representatives into the outlet to collect prices. Nonetheless, because initiation costs are significant, it may be advisable to restrict the prices included in the food price index to food prices that can be collected by scanning systems. Those currently comprise about 60 percent of the CPI food price index.

VII.B.2. Index Calculation

Index calculation would have to be carried out by an organization other than BLS. That is because the price collection procedures of the scanner company do not easily fit into BLS' current procedures. Also, BLS cannot be expected to produce two urban price indexes for food. What is important about the index calculation is that the organization that does the calculation follow exactly the same procedures for the urban index as for the rural index. The organization that computed the indexes could be the scanner company, or a subcontractor to the scanner company, or it could be a separate contractor with USDA.

VII.C. Budgetary Factors

For a number of reasons a budget was not estimated for the scanner alternative. One was that USDA/FCS would have to get involved in estimating an urban food price index as well as a rural food price index. An urban food price index is already produced by BLS, though, and having two competing government indexes does not seem feasible. There is also the expense of setting up with USDA a whole infrastructure to monitor the index production and that also does not seem feasible.

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VIII. PROS AND CONS OF THE ALTERNATIVES

VIII.A. Introduction

This report has presented four alternatives for estimating a CPI-type price index for food at home purchased by rural households. One of the alternatives has two variants. To summarize them, they are as follows:

1. BLS-only system:
   USDA contracts with BLS to administer every aspect of the price index system; Census or private organization conducts POPS in rural areas selected for sample.

2. BLS/NASS:
   NASS administers the price collection with a *large staff* while BLS trains field representatives, provides item specifications, verifies the data and computes the index; Census or private company does POPS in rural areas selected for sample.

3.a. BLS/PC: small-staff variant--USDA contracts with a private company to administer the price collection with a *small staff* while BLS trains the field representatives, provides item specifications, verifies the data and computes the index; Census or private company does POPS in rural areas selected for sample.

3.b. BLS/PC: large-staff variant--USDA contracts with a private company to administer the price collection with a *large staff* while BLS trains the field representatives, provides item specifications, verifies the data and computes the index; Census or private company does POPS in rural areas selected for sample.

4. Scanner system:
   USDA contracts with a private company which will use its own household data base to conduct a POPS, and will then administer the price collection system in outlets with scanner equipment where possible, or conduct on site price collection where not; the scanner company will also verify the data; it will compute the price index, or it or USDA will contract with another company for the index computation; the index would have to be compiled for urban and rural areas.

The intent of each of the systems is to answer the main question posed for this feasibility report, namely:

How does the movement in prices of food items typically bought by rural households compare with the movement in prices of food items typically bought by urban households?

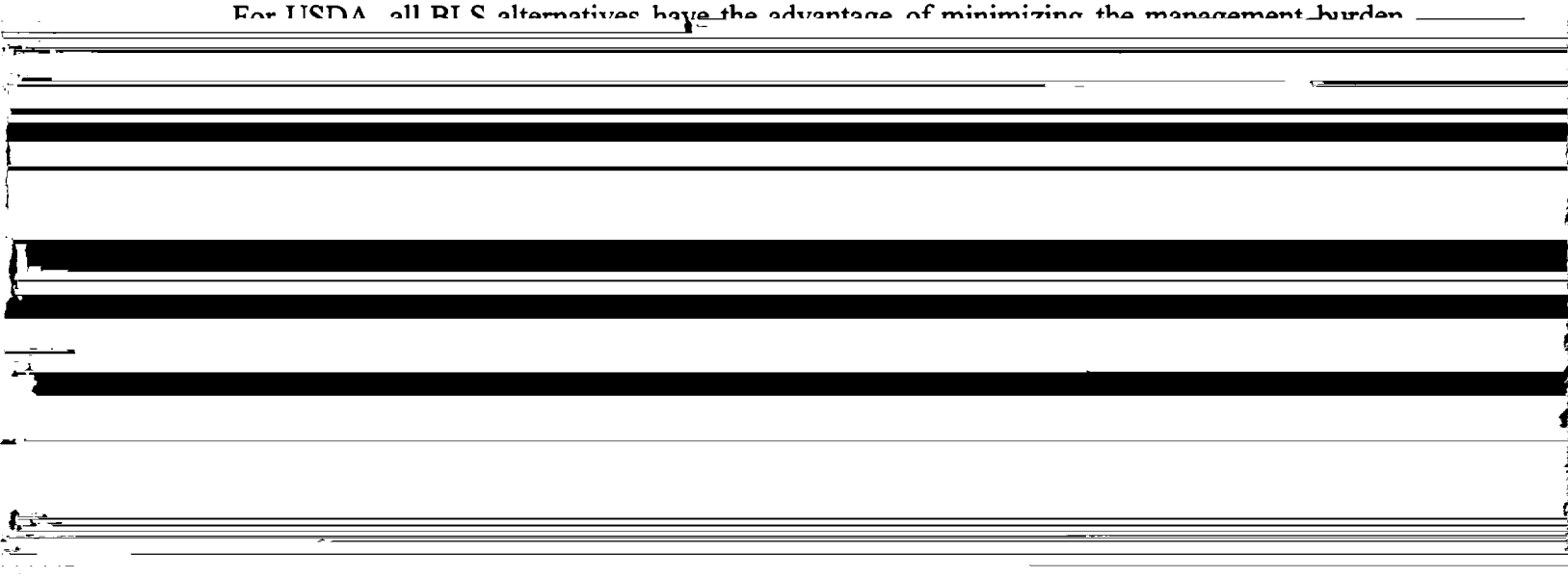
In answering that question, the intent is to minimize the effect of operational differences in price collection and index computation between urban and rural food price indexes. The purpose of minimizing the effect of those differences is to be able to determine whether in fact rural prices behave differently from urban prices without the finding being compromised by differences in collection and computational procedures across the organizations involved.

VIII.B. The BLS-type Alternatives

VIII.B.1. General Advantages and Disadvantages of All BLS-type Alternatives

The goal for the BLS-type systems is to produce an index for food at home in rural areas that is constructed in the same way as is the CPI for food at home. All the BLS-type alternatives should yield an index comparable to the CPI. The advantages of using a BLS-only system is that it will yield an estimate for a rural food price index that methodologically is most comparable to the CPI for food at home. Other BLS-type systems will emulate the BLS system for the CPI. Consequently, they will differ in some measure from the BLS system and will not receive the imprimatur of BLS--as signified by BLS publication of the index--even if BLS does the training and final index computation. Nonetheless, the other systems need to be considered to illuminate the trade-offs between comparability and cost.

For USDA, all BLS alternatives have the advantage of minimizing the management burden



in USDA except for general oversight, even in alternatives involving price collection by an

parameters concerning price collection and publication. There is one caveat which must be kept in mind when using private contractors. It is that BLS' willingness to compute a price index using outside data will depend on agreement on language concerning the labelling of the index.

By having BLS decide scheduling and other issues, USDA is relieved of most of the managerial burden for producing the index. Some managerial decisions still remain for USDA. Those include such things as the number of PSU's in the sample, the frequency of collection and the number of quotes per outlet. Once those decisions have been made, though, there are really no other managerial decisions outstanding.

For all the BLS-type alternatives described here for monitoring prices in rural areas, two issues have emerged that need to be considered. The first stems from operational methods for the price collection. All the variants outlined here, including the BLS alternative itself, are based on collecting prices during only one week of each month. The reason for that is to keep down the cost for a rural index. By collecting prices within a one-week timeframe, field representatives will have to visit the PSU only once. That contrasts with BLS' current procedure of spreading price collection within a PSU (or PSU half-sample) over a three-week timeframe. It does that to allow the CPI to pick up anomalous intra-monthly price changes. Because of its one-week timeframe, the rural food price index will be unable to do that. Any differences, though, in the two indexes because of anomalous intra-monthly price changes should wash out, and the CPI and rural price index should then be comparable; of course, monthly comparisons of the indexes will probably be affected by intra-monthly price changes. But that points up the recommendation made elsewhere in this report, namely that the comparisons between the CPI for food at home and the rural price index should be based on index changes that are over a longer time period, such as a year, rather than on changes that are for one month at a time.

The second issue that has emerged for all BLS-type alternatives has to do with the length of time under which comparison will have to be made between the CPI and rural food price

index. Probably at least four years will have to elapse before strict comparisons can be made between urban and rural price movements. One reason is that BLS plans to resample product categories on a four-year rotation cycle. That procedure will probably apply to food. A four-year cycle implies that on average new items and some new outlets will be fully reflected in the CPI only after a four-year delay. In comparison, the rural food price index will be more up-to-date at its inception and for several years thereafter.

Another important reason for basing analysis of movement between the two indexes on several years of data is that any conclusions to be drawn about differences in food price movements will reflect differences in items purchased, differences in expenditures on those items and differences in the movement in prices of the items selected for pricing. To test whether those differences are significant will require an adequate timespan. Of course, if differences do emerge, further analysis will be needed to determine their sources.

VIII.B.1.a. The BLS Alternative

The primary advantage of the BLS alternative has already been described, namely that if BLS constructs the rural price index, that index will be methodologically comparable to the CPI. Part of the advantage stems from the use of BLS personnel who (obviously) have been trained in BLS procedures and who are well-versed in price collection. Another part of the advantage stems from having personnel who are already in the field either in or near most of the PSU's from which prices will be collected. That serves to reduce the travel cost associated with this alternative. Finally, as Table VIII-1 indicates, the BLS alternative is competitive with the costs of the other alternatives.

VIII.B.1.b The NASS Alternative

The advantages of the NASS alternative are based on NASS' having personnel in the field who are dispersed throughout the U.S. and who have experience in conducting surveys. Because those personnel have experience in surveys, they may not need extensive training, and because they are dispersed, travel costs will not be a large element in NASS' costs. Indeed, NASS is quite competitive with BLS in terms of costs. (See Table VIII-1.)

There are several disadvantages of the NASS alternative. One is the expense of training the personnel in BLS practices. (Even those who have experience in surveying will need training in BLS practices.) Another disadvantage of the NASS variant is that its personnel will be engaged only infrequently in collecting prices (at best for only a few days at a time, with the specific frequency depending on the frequency of price collection). Hence, the staff will not be as adept at price collection as typical BLS personnel who collect prices on an ongoing basis.

Another disadvantage of the NASS alternative is systemic to any large-staff model. It is a potential problem scheduling training by BLS. The problem stems from two factors. One is that the upcoming revision of the CPI may not allow BLS to allocate resources to training outside personnel. As indicated in Section IV, though, that may not prove to be a significant problem based on the timeframe outlined there. The second problem is BLS' intention to switch from using paper forms to hand-held computers for data entry at the outlets. That will apparently require BLS to do a fair amount of staff-retraining. Again, the consequence is that BLS may be unable to provide training until it has retrained its own staff. Further discussion with BLS may clarify the issue.

VIII.B.1.c The PC/Large-Staff Alternative

The private contractor alternative utilizing a large staff has some of the advantages of the NASS alternative. It is that it will have personnel in the field dispersed throughout the U.S. Because they are dispersed, travel costs will not be a large element in the variant of this alternative.

On the other hand, there is some uncertainty about the personnel who would be used for collecting prices--whether they would resemble NASS personnel who have experience in conducting surveys or whether they would be individuals hired for the purpose of collecting prices. If they do not have experience, then they will need more extensive training than NASS personnel.

For this variant of the private contractor alternative, the disadvantage of the NASS alternative applies as well. Those include the low frequency with which field personnel will be engaged in collecting prices, and the potential problem about training by BLS.

A final disadvantage is one of cost. There seems to be no particular cost advantage associated with the large-staff variant of the private contractor model. (See Table VIII-1 below.)

VIII.B.1.d The PC/Small-Staff Alternative

The private contractor alternative utilizing the small-staff variant is based on having a small staff whose members travel on a regular basis from PSU to PSU to collect prices. The primary advantage of this alternative is the frequency with which the staff will be collecting prices. That will allow the staff to acquire a fair amount of expertise in collecting prices. Another advantage is that training costs will be very modest if only because, according to information gathered for this report, the staff will be recruited from the Washington, D.C. area and because the size of the staff will be quite modest. The disadvantage of the private contractor alternative, small-staff variant, is one of cost. The cost of travelling from PSU to PSU is apparently high enough to make this alternative the most expensive of all the BLS alternatives examined. (See Table VIII-1 below.)

VIII.B.2. Advantages and Disadvantages of Various POPS Alternatives

The cost of the POPS has turned out to be a significant factor in any of the BLS-type alternatives examined for this feasibility study. That will be true whether the POPS is conducted by Census or by a private organization, but will be all the more so if conducted by Census. There are a number of ways of minimizing the cost of the POPS. The purpose of the discussion here is to outline some of those ways, as well as the advantages and disadvantages of using Census versus a private organization.

One of the ways to minimize the POPS cost is to conduct the survey less frequently than is standard practice for the CPI. Currently, BLS plans to conduct a POPS for the CPI four

times a year. Based on consultation with BLS, it appears that a twice a year POPS will be sufficient for the rural price index and will not risk comparability with the CPI for food at home. Another way of reducing the POPS cost is to reduce the number of PSU's in which prices will be collected. Again, based on consultation with BLS, it appears necessary to collect prices in 14 PSU's rather than in 28 PSU's. To offset the effect on the overall number of quotes collected because of the reduction in PSU's, BLS suggested doubling the number of quotes to be collected from the outlets. That yields the same number of quotes for 14 PSU's as would be the case for 28 PSU's but with a significant cost savings.

Another way of reducing the cost of the POPS is to have a private organization conduct it instead of Census. Two organizations were contacted and asked how much they would charge for a POPS. Their cost estimates were lower than Census'. Of course, it may be that Census' costs will be reduced when it considers a formally presented, detailed proposal, but at the moment that is speculative. (Other considerations such as ability to differentiate rural from urban households do not come into play here because Census appears to have the ability to do that as do the private organizations.)

Assuming, then, that Census' costs remain unchanged, cost considerations alone would dictate using a private organization to conduct the POPS. Offsetting that consideration are two factors. One is that by using an organization other than Census, comparisons between the rural food price index and the CPI for food at home could become less precise than they otherwise would be. Whether that will be the case would depend on how well the private organizations can duplicate Census' efforts. Any degradation of or, for that matter even, improvement on Census' efforts might introduce an effect that reduces the comparability of the two indexes.

The second factor that needs to be considered is the position that BLS will take if Census does not do the POPS. While BLS at this time is unsure of its position on the matter, it outlined two possibilities. One would be not to publish the rural food price index in any of its standard publications. (USDA would of course be free to publish the index, but language on the index published would have to be worked out with BLS.) The second position is that

BLS would publish the index, but would footnote it to indicate that the index is not based on a POPS conducted by Census.

Obviously, cost considerations are important. USDA, though, has to weigh the tradeoffs between having Census do the POPS as opposed to having a private organization do it.

VIII.B.3 Comparative Cost of the Various Alternatives

For the several BLS-type alternatives examined, costs for the initiation period and for subsequent years were computed. They appear in Table VIII-1. The basis for the cost comparison is the 14-PSU configuration BLS thought would be adequate for a rural food price index, with twice the normal quotes collected per outlet and with the POPS to be conducted twice a year instead of the normal four times a year the POPS is conducted for the CPI. Finally, the estimate is for bimonthly collection rather than monthly collection. The period for the first initiation and POPS will probably have to be two years. The verification costs should be assigned only to the second of those two years.

In comparing the costs, it appears that both BLS and NASS are the low end of the cost estimates, while the private contractors are the high end. The primary advantage of the BLS alternative derives from the absence of training costs.

TABLE VIII-1
SUMMARY OF COST ESTIMATES OF BLS-TYPE ALTERNATIVES
14-PSU Configuration, 5900 Quotes and Bimonthly Collection

	Initiation Period				Each Subsequent Year			
	BLS	NASS	PC-Large	PC-Small	BLS	NASS	PC-Large	PC-Small
POPS (Census)	294	294	294	294	294	294	294	294
Training	--	56	82	--	--	11	16	--
Training & Initiation	--	--	--	170	--	--	--	89
Initiation	42	27	47	--	22	14	25	--
Routine Price Collection	--	--	--	--	70	44	98	215
Verification & Computation	109	109	109	109	115	115	115	115
TOTAL	445	486	532	573	501	478	548	713

VIII.C. A Scanner-type System

BLS-type alternatives have been considered because they permit food prices to be collected and compiled in a way that will make it possible to produce a rural food price index constructed the same as the CPI for food at home. The use of scanner methodology requires a different approach which makes it necessary to collect prices in both urban and rural areas so as to produce urban and rural food price indexes that will be comparable. The reason why the CPI cannot be used as a comparator is that collection methods based on scanner techniques can differ greatly from those based on BLS techniques. If the behavior of the rural index should be found to differ from that of the CPI, it will not be known whether it was because of the different collection methods or because of real differences in the behavior of urban and rural food prices.

The need to make two indexes if a scanner company is used appears to be one disadvantage to using the scanner alternative. A second disadvantage is the managerial burden on FCS (or USDA). In contrast, for the other alternatives, the managerial burden is slight. That is because BLS and the organization collecting prices would coordinate and schedule the production of the index. For the scanner alternative, though, FCS (or USDA) would have to produce the

schedule and probably oversee coordination between the scanner company and the company producing the index.

The advantage of scanner techniques really lies in the future. As scanners become more universal and as the number of scannable items increases, it will be possible to do more data collection electronically. That should reduce the need for a staff of field representatives and their attendant costs, and it may reduce the need for data verification. The net effect could be a considerably reduced cost for data collection and verification at some point in the future.

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APPENDIX 1 - MATRIX

	(1)	(2)	(3)	(4)	(5)	(6)
Questions-->	Do (food stamp) households living in under served urban/rural areas pay more* than those living in adequately served areas?	Is current level of food stamp allotment sufficient so that food stamp households residing in under served areas can purchase a nutritional diet?	Do (food stamp) households who shop in stores in under served area pay more than those who shop in stores in adequately served areas? (alt: Do stores in under served areas charge more?)	Does the movement in the CPI for food approximate how food prices change in rural areas?	Does the movement in selected components of CPI for food approximate price changes experienced by households in under served areas? (Could also be specific to food stamp households)	Do food stamp households living in under served areas have a different market basket from other food stamp households and is that a function of price differences?
Weights/Items	Market basket of (food stamp) households by area (items would be food stamp items)	TFP market basket	Market basket could be based on stores' food (stamp) sales (items would be food stamp items)	General market basket (all food items)	Food stamp market basket or market basket of adequately served areas (items would be food stamp items)	Food stamp market basket UA food stamp market basket
Stores	Stores where (food stamp) households in under served areas shop and stores where (food stamp) households in adequately served areas shop	Stores where food stamp households shop (stores can be in under served or in adequately served areas)	Stores located in under served urban and rural areas and stores located in adequately served areas	Collect prices from rural stores	Stores in under served urban and rural areas	Stores where food stamp households shop
Geographic (or other) Detail	Total U.S.; or urban and rural adequately served, urban under served and rural under served	Total U.S.; or urban and rural adequately served, urban under served and rural under served	Total U.S.; or urban and rural adequately served, urban under served and rural under served	U.S. total and rural	Total U.S.; or urban and rural adequately served, urban under served and rural under served	Total U.S.; or urban and rural adequately served, urban under served and rural under served
Type of Index	Place-to-place *Time-to-time*	Place-to-place *Time-to-time*	Place-to-place *Time-to-time*	Place-to-place** *Time-to-time*	Place-to-place** *Time-to-time*	A traditional place-to-place, does not address this, but data collected for one might be used
Parts of Comparison	Prices paid by (food stamp) households in under served, urban/rural areas	TFP cost in under served urban and rural areas	Prices charged in under served stores in urban and rural areas	Rural food index compared with that of CPI food index	Food index in under served areas compared with that of a "food stamp" CPI	Prices of items in UA food stamp market basket
	Prices paid by (food stamp) house-holds in adequately served areas	TFP cost in adequately served areas	Prices charged in adequately served stores			Prices of items in food stamp market basket
Group Focused on	Food stamp households living in under served areas	Food stamp households living in under served areas or food stamp approved stores in under served areas (urban and rural)	Food stamp approved stores in under served areas and (all?) stores in adequately served areas	Stores in rural areas (urban areas from CPI)	Stores in under served urban and rural areas	Food stamp households in under served areas
Policy Questions		Is food stamp allotment adequate in under served areas?		Is the CPI the appropriate estimator for rural food costs?	Can CPI components be used to approximate appropriate food stamp allotments?	Do food stamp households in under served areas have access to same items as those in adequately served areas?

Notes: *For time-to-time comparisons, substitute: "face prices that are rising faster" for "pay more"
**May be difficult to implement in practice because of BLS methodology.
Food stamp market basket - Average amounts and items determined by food stamp households actual expenditures (items are obviously food stamp items). UA market basket is the market basket in under served areas.
TFP market basket - Amounts and items determined by nutritionally sound diet of TFP
General market basket: food market basket of CPI.

Source: Joel Popkin and Company

APPENDIX 2

THE IOWA DATA COLLECTION FIELD STUDY

One of the unknowns that existed when this project began was how long it would take to collect prices in rural areas. A major concern was the amount of travel time between outlets as well as the amount of time that might have to be spent in the outlets. Hence, part of this feasibility study was to conduct a trip to several rural PSU's to see how much time was involved in travel and price collection. Three PSU's in Iowa near Waterloo were designated as the PSU's where the field study would take place.

Prior to the field study, information was gathered on where grocery stores and convenience stores were located in each of the three PSU's. The location information is from the *Iowa Business Directory*, published by American Business Directories (Omaha). The stores visited were only the rural ones (although clearly urban outlets would be included in any rural price index if households shopped there). Before they were visited, their permission was sought to visit them. About 15 percent of the outlets contacted would not provide that permission.

Nine to eleven stores were visited in each PSU. The representative who canvassed the PSU's went to the stores with a pre-selected list of 66 food items. On visiting the store, he recorded whether the item was available. He also mentally noted the price of the item and took enough time with each item to simulate writing down its price. (One of the criteria for getting permission to visit the stores was that prices would not be recorded.) The representative took a day to canvass each of the PSU's.

Tables A2-1 to A2-3 contain the information on the schedule used to visit the outlets in each PSU and the time spent at the outlets. The tables also contain mileage and travel times between outlets. Table A2-4 contains summary statistics for three PSU's and is based on the data found in Tables A2-1 to A2-3. Table A2-4 contains the figures used in various simulations of costs for the BLS alternative. In particular, note the travel time in minutes per outlet (22.9 minutes) and the travel miles between outlets (19.3).

Another important datum for this report is the amount of time it takes to record the price of an item. To know that, it is necessary to know how many items there are per outlet for which prices were "recorded" and the amount of time spent in an outlet recording them. The way to determine that datum is by combining data from Table A2-4 with data from Table A2-5. Table A2-5 provides information for determining the number of items per outlet. That is determined by summing the percentages in the first column of the table. The sum (divided by 100) is 44.8 which is the average number of items per outlet for which prices were "recorded." The mean visitation length in minutes for an outlet can be found in Table A2-4. It is 26.1 minutes. The amount of time spent per item (in minutes) is determined by dividing 26.1 by 44.8. That comes to 0.6 minutes per item. The figure of 0.6 was not used in the simulation, though, because of substitution needed for disappearing items. The actual figure used was 0.8 minutes per item.

In addition to determining those critical data, the person canvassing the outlets was asked to determine whether the store had a scanner, the size of the store in square feet, the number of registers, etc. A by-product of the visit was determining the distribution of non-packaged goods in typical rural outlets. That information can be found in Tables A2-6 to A2-8.

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TABLE A2-1

USDA Iowa Trip **TRAVEL STATISTICS**

DAY 1

Destination	Town	Departure Time	Miles	Roads Traveled	Road Quality	Arrival Time	Minutes Traveling	Minutes in Outlet
Grocery 1	Clarksville	08:35 am	30.7	218, 3, 188	good	09:10 am	35	28
Grocery 2	Clarksville	09:40 am	0.5	188	good	09:42 am	2	31
Grocery 3	Parkersburg	10:15 am	22.4	188, 3, 14, 20	good	10:38 am	23	34
Convenience 1	Parkersburg	11:15 am	0.5	20	good	11:20 am	5	14
Grocery 4	Applington	11:35 am	6.2	20	good	11:47 am	12	34
Grocery 5	Wellsburg	12:26 am	14.8	20, t19	good	12:51 pm	25	35
Convenience 2	Wellsburg	01:28 pm	1	214	good	01:33 pm	5	14
Convenience 3	Grundy Center	01:50 pm	13.1	214, 175	good	02:05 pm	15	16
Grocery 6	Grundy Center	03:03 pm	0.5	175	good	03:05 pm	2	37
Grocery 7	Dike	03:44 pm	16.5	14, 20	good	04:09 pm	25	29
Convenience 4	Dike	04:40 pm	0.5	20	good	04:43 pm	3	12
Return to:	Waterloo	04:59 pm	21.2	20	good	05:25 pm	26	

Summary				
Total Miles	127.9	Total minutes	178	284
Miles per outlet	11.63	Minutes per outlet	16.18	25.82
standard deviation	10.06	standard deviation	11.09	9.76

Note: "Minutes per outlet" in summary portion of table under the "Minutes Travelling" column is the travel time per outlet, and under the "Minutes in Outlet" column, it is the average time in the outlet.

TABLE A2-2

DAY 2

Destination	Town	Departure Time	Miles	Roads Traveled	Road Quality	Arrival Time	Minutes Travelling	Minutes in Outlet
Grocery 8	Dysart	08:00 am	30	21, 8	good	08:35 am	35	35
Convenience 5	Dysart	09:20 am	0.5	Main Street	good	09:21 am	1	16
Grocery 9	Gladbrook	09:41 am	24.4	8, 63, 96	good	10:06 am	25	33
Convenience 6	Toledo	10:41 am	20.2	96, 63	good	11:03 am	22	13
Convenience 7	Toledo	11:20 am	1.2	63	good	11:22 am	2	14
Grocery 10	Clutier	11:40 am	15	63, e43	good-many bends	11:58 am	18	26
Grocery 11	Blairstown	12:30 pm	29.6	36, 14, 30, 82	good-82 bumpy	01:03 pm	33	29
Grocery 12	Newhall	01:43 pm	12.2	82, 30, 287	good	01:58 pm	15	36
Convenience 8	Newhall	02:38 pm	0.5	287	good	02:39 pm	1	17
Convenience 9	Atkins	02:58 pm	10	e44	good	03:08 pm	10	15
Grocery 13	Shellsburg	03:24 pm	8	e24	good	03:35 pm	11	36
Return to:	Waterloo	04:15 pm	58.3	w26, 380, 20	good	05:09 pm	54	

Summary				
Total Miles	209.9	Total minutes	227	270
Miles per outlet	19.08	Minutes per outlet	20.6	24.6
standard deviation	15.93	standard deviation	15.33	9.65

Note: "Minutes per outlet" in summary portion of table under the "Minutes Travelling" column is the travel time per outlet, and under the "Minutes in Outlet" column, it is the average time in the outlet.

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TABLE A2-3

DAY 3

Destination	Town	Departure Time	Miles	Roads Traveled	Road Quality	Arrival Time	Minutes Travelling	Minutes in Outlet
Grocery 14	Oxford Junction	09:00 am	48.8	30, k64	good	09:58 am	58	29
Convenience 10	Oxford Junction	10:28 am	1	Mainstreet	good	10:30 am	2	12
Convenience 11	Cascade	10:44 am	26.6	136	good	11:13 am	29	17
Grocery 15	Cascade	11:31 am	2	136	good	11:35 am	4	38
Grocery 16	St. Point	12:15 pm	53.8	136, 20, 38, 3	good	01:16 pm	61	37
Convenience 12	St. Point	01:54 pm	1.2	136	good	01:57 pm	3	16
Grocery 17	Winthrop	02:14 pm	25.3	3,187, 939	good	02:44 pm	30	35
Grocery 18	Jessup	03:21 pm	18.3	939	good	03:47 pm	26	39
Grocery 19	Fairbank	04:29 pm	11.2	v62	good	04:48 pm	19	33
Return to:	Cedar Rapids	05:22 pm	73.2	v62, 20, 380	good	06:35 pm	73	

Summary				
Total Miles	261.4	Total minutes	305.0	256.0
Miles per outlet	29.04	Minutes per outlet	33.89	28.44
standard deviation	23.70	standard deviation	24.33	10.58

TOTAL TRAVEL STATISTICS

Total Miles	599.2	Total minutes	710.0	810.0
Miles per outlet	19.33	Travel Minutes per outlet	22.90	26.13
standard deviation	18.15	standard deviation	18.49	9.76

Note: "Minutes per outlet" in summary portion of table under the "Minutes Travelling" column is the travel time per outlet, and under the "Minutes in Outlet" column, it is the average time in the outlet.

TABLE A2-4
SUMMARY STATISTICS OF IOWA FIELD STUDY

Part A: Travel Statistics

Total miles traveled	599.2
Miles per outlet	19.3
Standard deviation	18.2
Total travel minutes	710.0
Minutes per outlet	22.9
Standard deviation	18.5

Part B: Store Statistics

	All Stores	Convenience	Grocery
Number of stores visited	31	12	19
Mean visitation length in minutes	26.1	14.7	33.4

TABLE A2-5
DISTRIBUTION OF FOOD ITEMS
(All stores and by type of store)

ITEM	ALL STORES (percent of stores carrying each item) n=31	CONVENIENCE (percent of stores carrying each item) n=12	GROCERY (percent of stores carrying each item) n=19
FROZEN FOODS			
Frozen broccoli (spears)	58.1	8.3	89.8
Frozen orange juice	87.1	66.7	100.0
Frozen pies	54.8	0.0	89.5
ice cream (1 gal.)	77.4	50.0	94.7
Frozen Turkey	32.3	0.0	52.6
Frozen Pizza	96.8	91.7	100.0
Frozen fish	64.5	16.7	94.7
MEATS			
uncooked ground beef	58.1	0.0	94.7
uncooked beef roast	45.2	0.0	73.7
uncooked beef steak	58.1	0.0	94.7
uncooked veal	0.0	0.0	0.0
bacon	83.9	58.3	100.0
ham	71.0	25.0	100.0
pork chops	48.4	0.0	78.9
pork roast	22.6	0.0	36.8
frankfurters (pack)	80.6	50.0	100.0
bologna (pack)	80.6	58.3	94.7
lamb chops	0.0	0.0	0.0
chicken (whole fryers)	32.3	0.0	52.6
fresh catfish	0.0	0.0	0.0
DAIRY PRODUCTS			
margarine (stick)	80.6	50.0	100.0
butter (stick)	77.4	41.7	100.0
eggs (medium 1 dozen)	87.1	75.0	94.7
milk (1 gallon)	96.8	91.7	100.0
cream cheese	71.0	33.3	94.7
cottage cheese (16oz)	64.5	25.0	89.5
yogurt	80.6	50.0	100.0
FRESH FRUITS & VEGETABLES			
apples	64.5	8.3	100.0
bananas	58.1	8.3	89.5
oranges	58.1	0.0	94.7
grapes (white seedless)	51.6	0.0	84.2
potatoes	64.5	8.3	100.0
lettuce	61.3	8.3	94.7
tomatoes	58.1	0.0	94.7
cucumbers	41.9	0.0	68.4
CANNED GOODS			
peas (15oz)	80.6	50.0	100.0
tomato soup	93.5	91.7	94.7
olives (black, medium)	54.8	8.3	84.2
tuna (oil, 6oz)	96.8	91.7	100.0

(cont.)

TABLE A2-5
DISTRIBUTION OF FOOD ITEMS
(All stores and by type of store)

ITEM	ALL STORES (percent of stores carrying each item)	CONVENIENCE (percent of stores carrying each item)	GROCERY (percent of stores carrying each item)
DRINKS			
apple juice	96.8	100.0	94.7
cola (2 liter)	100.0	100.0	100.0
snapple-type drink	80.6	100.0	68.4
coffee (caffeinated, 8oz)	80.6	50.0	100.0
tea (16 bags)	77.4	41.7	100.0
SWEETS			
non-dairy creamer (pint)	77.4	50.0	94.7
pound cake	3.2	0.0	5.3
oatmeal cookies (pack)	87.1	83.3	89.5
doughnuts (loose or packed)	90.3	100.0	84.2
tarts	90.3	83.3	94.7
chewing gum (pack)	100.0	100.0	100.0
licorice (black or red)	100.0	100.0	100.0
chocolate bar	100.0	100.0	100.0
BREADS			
white (1 lb)	77.4	41.7	100.0
Kaiser rolls	22.6	0.0	36.8
OTHER ITEMS			
raisins	90.3	91.7	89.5
Italian dressing (8 fl oz)	71.0	25.0	100.0
vegetable oil (48oz)	71.0	25.0	100.0
flour (white all purpose, 5lbs)	67.7	16.7	100.0
corn flakes	71.0	25.0	100.0
rice (white, 2lbs)	67.7	16.7	100.0
salt (iodized)	71.0	25.0	100.0
BBQ sauce (16 oz)	77.4	41.7	100.0
relish	80.6	50.0	100.0
baby food (pureed carrots)	64.5	25.0	89.5
chocolate syrup (24oz)	74.2	33.3	100.0
peanut butter (1 lb)	100.0	100.0	100.0
prepared salads	0.0	0.0	0.0
Sum of Percents (divided by 100) - All Items	**44.8**	**25.9**	**56.8**

TABLE A2-6
SUMMARY STATISTICS OF IOWA FIELD STUDY

	All Stores	Convenience	Grocery
Percent of Stores with:			
Fresh fruits and vegetables	61.3%	0.0%	100%
Fresh meats	61.3	0.0	100%
Frozen meats	64.5	8.3	100%
Scanners	35.5	25.0	42.1%

APPENDIX 3

THE POPS

Section III provided a general description of the POPS. This appendix provides a more detailed discussion of the new "TPOPS" that will be conducted for the upcoming CPI revision, and the problems of coverage and of cost created by it for this study. This Appendix will describe solutions to those problems engendered by the TPOPS.

A. The Importance of the POPS

The importance of the POPS for this study is two-fold. One is to provide a way of accepting or rejecting the hypothesis that rural households shop in the same places as do urban households. If the hypothesis is accepted, then there will be no need to construct a rural price index for food. The prices paid by the rural households would be the same as those paid by urban households. A rural price index for food would then end up looking just like that of an urban price index appropriately weighted. The other is to provide a framework for sampling outlets at which rural households shop should the hypothesis be rejected and a rural food price index needs to be calculated.

To be able to test whether rural households shop in the same places urban ones do, a minimum number of observations of rural households would be needed. Based on the number of households that would be surveyed per PSU, which is 140, it appears that nine PSU's is the minimum number needed to test the hypothesis. That would yield 1,260 observations which provides estimates with a precision of ±3 percent.

B. The Sampling Frame for the POPS

The first decision to be made is to determine the areas in which to conduct the POPS, keeping in mind that prices may have to be collected in those areas as well. One route for USDA is to select a new sample of non-metro PSU's. Another route is to select a sample of PSU's from the *C* and *D* PSU's used for the consumer expenditure survey. Discussions with BLS indicated that the *C* and *D* PSU's could be used as a sampling frame with one caveat:

that the *C* and *D* PSU's should be stratified by geographical area and some PSU's selected from each area.

BLS suggested that 14 PSU's of the 28 *C* and *D* PSU's should be selected for the rural index. The 14 PSU's should be distributed as follows: four in the west; four in the north-central; four in the south; and two in the east.

The advantage of using the *C* and *D* PSU's is that there is a positive probability that some *C* PSU's would be selected for the POPS. The *C* PSU's in the sample will reduce the cost of collection for a rural index. This is because BLS will have personnel in those PSU's thereby reducing the travel costs to the PSU's. BLS will also be collecting prices in those PSU's from some of the outlets at which rural households shop. That will serve to reduce initiation and routine price collection costs as well.

C. A Description of the New POPS

In the past, the data necessary for the POPS were collected by conducting personal interviews with respondents. In the upcoming revision of the CPI, the personal interview will be replaced by a telephone interview. BLS and Census have been planning and are testing the new POPS (called here the TPOPS). They plan to introduce it in January 1997. The first initiation for *price collection* based on that TPOPS will be January 1999.

Major changes will be introduced in how the TPOPS will be conducted and the kinds of information gathered from it. One major change is the number of PSU's in which the TPOPS will be conducted annually. Formerly, a complete POPS was conducted in one-fifth of the PSU's every year. For the upcoming CPI revision, a partial TPOPS comprising about 25 percent of all POPS categories[14] will be conducted in every PSU every year. After 4 years, all the categories will have been covered. The changes were instituted because of criticism

[14]A POPS category can encompass several of the categories for which price indexes are published in the CPI.

about the lack of timeliness in introducing new outlets into the CPI. With the new TPOPS, every PSU will experience replenishment of the outlet sample every year. As a byproduct, the replenishment of the outlets is the need to re-initiate some portion of the items priced every year. For the food categories of the TPOPS, BLS has not yet clarified what the new procedures will be. In particular, it has not clarified whether in each year some food categories will be included in the TPOPS or whether in some years no food categories will be included. If some food categories are included every year in the TPOPS, then each PSU will have to be sampled every year.

For the TPOPS for the CPI, each household will be interviewed four times during the year. That will reduce the seasonal bias that may have been present in the one-time interview. For a rural price index, though, a four times a year TPOPS poses a problem because of the subsequent impact it has on costs. A solution is to reduce the frequency of the TPOPS to twice a year (a solution suggested by BLS). In the cost estimates presented here, a twice a year TPOPS was assumed for food.

The number of TPOPS categories is still not final. The current estimate, though, is 217 of which 49 are food-at-home. Each household will be asked about 16-20 food categories while it is in the sample. For the rural index, the first year TPOPS will have to ask more food categories because of the suggestion to do it only twice a year. Also, food has more unique outlets than are reported for other CPI components. Hence, interviews for the food categories of the TPOPS will take more time than interviews for other categories.

In addition to the expenditures and outlets, selected characteristics of the household will be collected about the "reference person," generally the head of the household. Those are age, sex, race, marital status, and family size of the household. BLS is also considering asking income class. On the other hand, no information will be collected about the number and ages of the children, or the composition of the household.

Besides changes in the contents of the POPS, there are other significant changes. They include how the sample is drawn and how the geographical units have been introduced into the TPOPS. The sample of households will be obtained from telephone numbers supplied by a private company, Genesys, for the specified PSU's. Census has determined that an adequate number of households per half-sample will be 140 (down from 160), with the largest PSU's having more than one half-sample and the *B* and *C* PSU's having only one.

For the TPOPS, the time for the interview has been reduced to 12 minutes from pick-up to hang-up and Census hopes to reduce it further by using trained interviewers. The best response rate for the TPOPS has been 85 percent, somewhat lower than the personal interview rate at 90 percent. An offset to the relatively short interview is that 1,000 calls have to be made to get 450 eligible units. (That is known as the hit rate.) The reason for a hit rate of 45 percent is that some numbers sampled are businesses, or are not at home after 12 tries, or are otherwise ineligible. In rural areas, though, the hit rate may be higher because there will be fewer businesses.

An important difference between the former POPS and TPOPS is that the TPOPS conducted by Census for BLS will not ask for the address of the household. Because Census will not ask for the address that means that its TPOPS for BLS will be unable to distinguish between urban and rural households in non-metropolitan PSU's with urban places. Therefore, both urban and rural households will be in the BLS sample, just as in the metropolitan areas.

For estimating the urban CPI, the inclusion of rural households is a very minor drawback of the new TPOPS. For estimating a rural food-at-home price index, though, that is not the case. The problem arises because the number of rural households in urban places will be a significant fraction of all households and need to be identified in nonmetropolitan areas. Hence, other alternatives to Census' current methods for BLS have been examined to try to delineate truly rural households.

One alternative is to use a reverse phone book. It contains addresses sorted by phone number in contrast to the standard phone book which contains phone numbers sorted by name. Genesys and Census have both indicated that the reverse phone book is a feasible option for determining the address of the household without having to ask the respondent. (There has been some concern about asking the respondent the address because of the possibility of sharply reducing the response rate.) The use of the reverse phone book also allows phone numbers to be pre-screened for addresses before they are called. That allows clearly urban households to be screened out from the households surveyed. The additional cost of selecting phone numbers with a reverse phone book is nominal based on information provided by Genesys. Census also indicated it could simply ask the respondent for the household's address. To mitigate any effect that question might have on the response rate, Census said it would ask the question only at the end of the interview.

Another method suggested by Genesys for distinguishing rural households from urban households is to use information on Census tracts. Genesys currently has telephone numbers mapped to Census tracts. The drawback with the use of Census tracts is even at this low level of geography both urban and rural places may be included. So, some kind of allocation method would have to be used for those households and that could require some oversampling of rural PSU's to achieve the necessary number of rural households.

Yet another method for distinguishing urban from rural households is by examining differences in reported expenditures by outlet of selected items. That is because for those items, the likelihood is small that urban households will patronize rural outlets to any significant extent. It would be reasonable to assume, therefore, that households which report a high proportion of purchases of those selected items in rural outlets are rural households. Also, the assumption can be made that rural households will not travel long distances to purchase certain selected items while they will travel a long distance for other items. While either method would be an indirect way of categorizing the geographical location of the household, they nevertheless provide another means for such categorization.

Partly for the purpose of distinguishing between urban and rural households, two alternatives to Census for conducting a TPOPS were also examined. Specifically, inquiry was made of two private companies about whether they could do a TPOPS that they could distinguish between urban and rural households in the non-metropolitan PSU's. One indicated that it could do that by oversampling the PSU so as to be able to allocate households in the urban fringe areas of the PSU. To do that would require oversampling households in PSU's with urban places by doubling the sample size to about 280 households. A second indicated that it could distinguish between urban and rural households by means of questions that would elicit information on the type of area in which the households are located.

D. Cost of the TPOPS

The cost of the TPOPS will be the first cost encountered in collecting prices in rural areas. What makes the TPOPS such an important cost element in any hypothetical data collection system is that its cost will be substantial and it will be encountered every year. That is because of BLS' plans to resample outlets in the upcoming CPI revision by resampling one-fourth of all the POPS categories every year in all PSU's. If even some food POPS categories are included, then a new TPOPS will have to be conducted every year in all rural PSU's in the rural price index. That means contacting 140 (or 280) households in each PSU every year. Insofar as there is a large fixed cost element in Census' charge for a TPOPS--though experience may reduce that some--the likelihood is that TPOPS costs will be the same every year even if only a few questions are asked. Of course, if the TPOPS in any one year includes no food-at-home categories, then no TPOPS would have to be done in that year; and that would reduce considerably the overall expense of collecting food prices for a rural food index. The entire set of costs associated with the TPOPS can be summarized as follows:

1: Cost of choosing the PSU's for TPOPS;
2: Cost of surveying households, the number of which is usually 140 per PSU (under the upcoming CPI revision) or 280 for a private organization;
3: Cost of choosing outlets after completion of the survey should prices need to be collected.

The first element of cost of the TPOPS--choosing the PSU's--will be zero if USDA chooses to stay with all 28 *C* and *D* PSU's. That is because no additional PSU selection will have to be made. Even if a subset from those 28 is ultimately chosen, the cost of choosing it should be small. The cost would be larger if PSU's outside the 28 were included in the TPOPS. No estimate was made for selecting PSU's other than those 28.

The second cost element of the TPOPS depends primarily on the number of households interviewed and the cost per successful interview. Based on information from Census, it appears from tests it is now conducting that the cost per successful interview is about $75. If the questions are limited to food, the costs might be less. Food categories are easier to collect, and in rural areas there may not be that many outlets reported. On the other hand, costs might be more because of the start-up costs in rural areas and because information may be needed for all the food categories. The exact cost would have to be estimated based on the particular design USDA has in mind. In estimates made for this study, the estimate of cost per successful interview was assumed to range from $60 to $90 for the Census TPOPS. Those estimates were presented in the earlier sections where budgetary factors were discussed.

Two private organizations were contacted and asked to estimate how much they would charge for a TPOPS. One provided an estimate of $20 per successful case, but it was the one suggesting doubling the sample size in PSU's that included urban places. The other provided an estimate of $56 per successful case, but without the need to double the number of households.

The second cost element of the TPOPS would also be affected if USDA would like to add additional questions to elicit information of interest to it about factors influencing purchasing patterns. Such questions would pertain to the household composition, car ownership, how many miles usually driven to do grocery shopping, etc. A question about miles driven for grocery shopping may allow inferences to be made about adequacy of access to food stores in rural areas. Additional questions could be added by Census but only after they have been tested. The least expensive and generally most informative means for testing questions is to

assemble a focus group, and test the questions and discuss the semantic problems with the group. BLS has a Cognitive Laboratory in which such testing is done under contract. USDA will have to determine the questions it will want added to the TPOPS.

The third cost element is choosing the outlets. If a separate contract to do the POPS is given to Census, one possibility would be to have Census do the sample selection of outlets. Currently BLS does that after a somewhat complicated coding and verification procedure that involves Census' coding from a master list, BLS review, BLS Field Office correction, more of Census' coding, more BLS review and selection, and then Field Office verification. In the past, it has taken one year from collection to initiation. BLS hopes to cut that down to six months, so that the outlets are not so "old" at the time of initiation. If a private organization will be doing the price collection, it could select the outlet sample. The cost of choosing the outlets appears to be small. Hence no estimates have been presented for it below.

Based on information provided by Census and the private organizations, the cost of several elements of the TPOPS was estimated. The estimates were made for each kind of organization based on twice a year TPOPS. The estimates can be found in Table A3-1.

TABLE A3-1
TWO ESTIMATES OF COST OF POPS

	Census	Private Contractor	
		(1)	(2)
(1) Number of households per PSU	140	280	140
(2) Cost per household	$90-$60	$20	$56
(3) Cost per PSU = (1) x (2) x 2	$25,200 -$16,800	$11,200	$15,680
Cost for the following PSU's:			
28	$705,600 -$470,400	$313,600	$439,040
14	$352,800 -$235,200	$156,800	$219,520
10	$252,000 -$168,000	$112,000	$156,800

APPENDIX 4

COST ELEMENTS FOR BLS AND OTHER ALTERNATIVES

As described in Section III, there are two main elements of cost in any of the hypothetical data collection systems. One is the POPS cost and the other is the price collection costs. The POPS cost which is common to all models has been presented in Appendix 3. The elements of cost for the various price collection alternatives are summarized in this Appendix. Many of those elements are specific to the BLS alternatives. Some, though, are needed for other alternatives. Hence, the reason for summarizing them here.

Based on Section III, price collection can be decomposed into the following sub-tasks:

i: Recruiting/supervision
ii: Training
iii: Initiation
iv: Travel to the PSU
v: Routine price collection

Associated with each sub-task is a cost. Some of the organizations that were contacted provided estimates of some or all costs for each of the sub-tasks for certain configurations of PSU's and for a certain frequency of collection. Based on those figures, estimates were made for other configurations and frequencies of collection. For BLS, estimates were made for each element based on information supplied by BLS.

i: Recruiting/supervising

To begin the price collection procedure, the first sub-task that needs to be performed is to recruit the field representatives who will do the actual price collection.

If BLS does the price collection, the assumption is that the field representatives will be BLS personnel from nearby PSU's or, in some cases, from the PSU itself. In either case, there is

no recruiting cost. Supervisory costs were handled separately and will be described where appropriate.

If BLS does not do the price collection, then the assumption is that the non-BLS organization will use personnel from its own staff in one of two models. In one model, the non-BLS organization will use its own personnel from nearby PSU's or from the PSU's where the prices will be collected. In that model, there will be a large staff whose number would be as large or larger than the number of PSU's from which prices will be collected. In the second model, the non-BLS organization will recruit personnel from a single location who will then travel to the PSU's where the prices will be collected.

In any of those non-BLS configurations, no information was supplied separately about recruiting or supervision. It appears that those costs were included in the overall costs supplied by the non-BLS organization.

ii: Training

The next sub-task that needs to be completed is training the personnel that have been recruited. The costs associated with training depend on the organizational structure. If BLS does the price collection, the assumption is that the incremental training costs are minimal for USDA. If a non-BLS organization supervises the price collection, then the training costs potentially involve the four cost elements for each trainee. Those elements can be found in Table A4-1 and costs associated with them in Table A4-2.

TABLE A4-1
FOUR TRAINING COST ELEMENTS

1. Two airfares to BLS headquarters in Washington, DC;
2. The per diem costs (hotel and meal charges);
3. The hourly cost of the trainee;
4. The BLS charges for training.

TABLE A4-2
COSTS ASSOCIATED WITH TRAINING COST ELEMENTS

The following costs are assumed for each element:

1. Air fare:	$400
2. Per diem:	$160
3. Hourly cost:	$12 * 1.3 = $15.6 (30% fringe benefits)
4. BLS charge:	Not available at this time.

The training sessions at BLS comprise two sessions with the first one being two weeks and the second being one week. The assumption was that a trainee would be paid for eight hours a day for fifteen days and would stay over a 20 day period to account for arrival and departure times. Hence, the cost per trainee would be as follows:

[(15 * 8) * $15.6] + (20 * $160) + (2 * $400) = $5,872.

The largest portion of training costs will be encountered in the start-up of the price collection system. Nonetheless, training costs will be a recurring cost. That is because of attrition of the field representatives and because of the need for re-training. For example, there is a session once a year for sample rotation. In estimating ongoing training costs estimates have been presented only for attrition. The attrition rate was assumed to be 20 percent.

iii: Initiation and Routine Price Collection

The next set of major costs involve the actual price collection. Price collection has two sub-tasks. The first is initiation of outlets to select the items and initial prices for the index. The second, which comes after initiation, would be routine price collection.

The cost of initiation will be incurred at the beginning of the data collection process. It will also recur every year because of the need to resample one-fourth of the POPS categories every

year. The recurring cost will not be as large as the initial cost. The estimate presented for ongoing initiation costs assume 25 percent of the items will be reinitiated every year. The additional year initiation costs are probably upper bound figures.

Both initiation and routine price collection costs in a PSU will depend on the number of outlets from which prices will be collected. The number of outlets weigh heavily on the costs because of the travel time between outlets. Based on time estimates made for this study, the number of items for which prices would have to be collected do not have as large an effect on costs.

The non-BLS organizations that were contacted for this study provided aggregate estimates. Hence, the estimates presented for them are based on those aggregates. For BLS, by contrast, costs for initiation, travel and routine collection were constructed based on the more detailed information provided by BLS.

For the 14 PSU configurations, two cost estimates were made. One was based on the standard approach which is to collect one price from each POPS category at an outlet (except for categories with seasonal items). The other estimate assumed twice as many quotes which allows the variance to be the same as for 28 PSU's without the increased cost of the POPS.

The cost components used in constructing a cost estimate for BLS of initiation and routine price collection can be found in Table A4-3. Please note, again, that JPC developed the estimates presented here. They are derived from data supplied by BLS and carry the restrictions noted in the Executive Summary and in Section IV.

TABLE A4-3
THE FOUR COST COMPONENTS OF INITIATION & ROUTINE PRICE COLLECTION

1. Time spent by the field representative in the PSU;
2. Supervisory costs;
3. Mileage cost for auto use within the PSU;
4. Travel costs to and from the PSU.

The estimate for cost element 1 was based on a combination of information provided by BLS on wages and fringe benefits and information on time and distances gathered from the Iowa experiment as well as information on the number of POPS categories and outlets to be chosen per POPS category.

Table A4-4 summarizes the assumptions made for this study that went into determining BLS cost estimates. (Please note, again, that the estimates presented here were derived from BLS data but are not binding on BLS.)

TABLE A4-4
ASSUMPTIONS FOR BLS COST ESTIMATES

Hourly wages:	$12
Fringe benefits:	30 percent
Supervision rate:	50 percent
Mileage costs for auto:	30 cents per mile
Time to price an item:	
initiation:	10 minutes
routine price collection:	0.8 minute
Number of POPS categories:	58
Number of food categories:	62
Number of outlets in a PSU:	30
Number of miles between outlets:	19.3
Average time between outlets:	22.9
Per diem and hotel:	$160

Note: It was assumed that five of the outlets were substantially larger than the remaining 25.

Common to both initiation and routine price collection are the travel costs for field representatives who are not in the PSU. Travel costs will depend on how the field representatives get to the PSU. For the BLS alternative, travel to the PSU can be by car (14 PSU's) or by plane (4 PSU's). That is determined by how far the rural PSU is from the nearest PSU with BLS field representatives. No travel costs would exist for ten PSU's.

Total travel costs to the PSU's will depend on the configuration of PSU's. If all 28 non-metropolitan PSU's are in the rural price index, then a relatively precise figure can be estimated. If on the other hand, fewer than the 28 are in the index, then only an average can be estimated along with high and low bounds on the estimate because of the probabilistic ways in which PSU's will be chosen. The components of travel costs can be found in Table A4-5.

TABLE A4-5
FOUR COMPONENTS OF TRAVEL COSTS

1. Time spent by the field representative on travel;
2. Mileage costs for auto travel;

For the non-BLS alternatives, travel costs would depend on how the organization responsible for the collection determines the best way to get its personnel to the PSU's. For the model which involves having field representatives travel from PSU to PSU, travel costs become an appreciable cost of the price collection system.

TABLE A4-6
TRAVEL DISTANCES (excluding air travel) FROM A, B, OR C PSU's TO D PSU's

D PSU's	CITIES USED IN MEASUREMENT	ONE-WAY DISTANCE (MILES)	ROUND TRIP DISTANCE (MILES)	APPROXIMATE ONE-WAY TRAVEL TIME (HOURS)
CA (air)	Fresno Airport to Lemoore	30	60 (PLUS AIR TRAVEL)	00:30
NM (air)	Santa Fe Airport to Espanola	30	60 (PLUS AIR TRAVEL)	00:30
OK #1	Oklahoma City to Alva	170	340	02:45
OK #2	Oklahoma City to Tahlequah	165	330	03:20
IA	Lincoln, NE to Adair	130	260	02:15
MO	St. Louis to Lebanon	165	330	02:50
AR	Pine Bluff to Star City	25	50	00:35
MS	Picayune to Hattiesburg	65	130	01:00
TN (air)	Memphis Airport to Dyersburg	85	170 (PLUS AIR TRAVEL)	01:25
IN	Dayton, OH to New Castle	60	120	01:00
MI	Midland to Reed City	70	140	01:20
KY	Morristown, TN to Pikeville	150	300	02:30
NC	Spartanburg, SC to Boone	100	200	01:45
VA	Richmond to Louisa	55	110	01:10
NY #1	Buffalo to Wellsville	80	160	01:30
NY #2	Syracuse to Ithaca	60	120	01:10
NY #3	Burlington, VT to Saranac Lake	100	200	02:10
ME (air)	Fly into Presque Isle	0	0 (AIR TRAVEL ONLY)	0
TOTAL			3080 (PLUS 4 AIR TRAVEL)	27:45
AVERAGE			171.1	01:36
STANDARD DEVIATION			101.5	00:48

Note: For air travel, distance is from the airport to the PSU.
Source for travel times: Rand McNally *1996 Road Atlas.*

TABLE A4-7
APPROXIMATE AIR TRAVEL COSTS TO THE D PSU's IN NEW MEXICO, TENNESSEE, CALIFORNIA AND MAINE

(all costs assume that the person flies between Monday and Friday and gives at least a 7 day notice)

Maine PSU		
1) Flying from Boston to Presque Isle via USAir Express		$283
Tennessee PSU		
1) Flying from St. Louis to Memphis via TWA		$558
2) Flying from Cincinnati to Memphis via TWA		$590
California PSU		
1) Flying from L.A. to Fresno via United Airlines		$218
New Mexico PSU		
1) Flying from Denver to Santa Fe via United Airlines		$285
Total Airfare cost range:	Minimum	$1,344
	Maximum	$1,971

APPENDIX 5

THE BLS ALTERNATIVE: DERIVATION OF COSTS

Appendix 4 presented the primary elements of cost for the BLS alternative. This appendix will use the results from Appendix 4 to show how BLS costs were estimated. The derivation will be based on the outline of costs presented in Section III.D. A summary of the basic *per PSU* cost elements can be found in Table A5-1.

TABLE A5-1
PER PSU COST ELEMENTS FOR BLS ALTERNATIVE

		Standard Number of Quotes	Twice Standard Numbers of Quotes
i.	Recruiting/supervision	0	0
ii.	Training	0	0
iii.	Initiation		
	- First Year	$1,400	$2,792
	- Additional Year	$796	$1,362
iv.	Travel to the PSU	$208	$208
v.	Routine price collection	$520	$632

Travel costs will be incurred for both outlet initiation and for routine price collection. When travel costs are added to *iii. and v.* the following are total costs per PSU visit:

	Standard Number of Quotes	Twice Standard Number of Quotes
Outlet initiation:		
First Year	$1,608	$3,000
Addition Year	$1,000	$1,570
Routine price collection:	$728	$840

The estimation of total costs then depends on the number of PSU's and for routine price collection on the frequency of price collection as well. Table A5-2 illustrates how that computation is done. It should be noted that the results do not exactly match the figures presented in Section IV. That is because of rounding and the probabilistic aspect of outlet selection.

TABLE A5-2
HOW AGGREGATE ANNUAL COSTS ARE DERIVED FROM PER PSU COSTS

		Number of PSU's		
		28	14	10
Outlet Initiation:		28*1608	14*1608	10*1608
Routine Price Collection: (by frequency)				
Monthly	(x12)	12*28*728	12*14*728	12*10*728
Bimonthly	(x 6)	6*28*728	6*14*728	6*10*728
Quarterly	(x 4)	4*28*728	4*14*728	4*10*728

As Appendix 4 indicated, travel costs will depend on which PSU's have been selected for the index, when the number of PSU's selected is fewer than 28. That is because of the probabilistic way in which the PSU's would have to be chosen. So, for example, one random draw can yield a set of 14 PSU's containing no *C* PSU's and the four PSU's that have to be reached by air. Another random draw can yield a set that contains all the *C* PSU's and other PSU's in close proximity to urban PSU's. Consequently, the estimates presented for the BLS costs are average costs based on the expected random draw of PSU's.

In the course of determining the average costs of travel, high and low estimates for travel costs were also determined. Table A5-3 presents the high and low estimates for travel costs on a per PSU basis and on an aggregate basis for configurations comprising fewer than 28 PSU's. The annual cost will depend on the frequency of collection.

TABLE A5-3
HIGH AND LOW ESTIMATES FOR TRAVEL

	Per PSU	14 PSU's	10 PSU's
High Estimate:	$324	$4,536	$3,240
Low Estimate:	$59	$406	$590

APPENDIX 6

THE BLS/NASS ALTERNATIVE: DERIVATION OF COSTS

The cost of the BLS/NASS alternative was based on assumptions provided to NASS about pricing frequency, number of PSU's to be priced, etc. That information differs in some details from that used for the BLS and other alternatives. The assumptions are close enough, though, so that the cost of the NASS alternative is relatively comparable to the other cost estimates.

The assumptions used for the BLS/NASS alternative are as follows:

Number of PSU's: 28
Frequency: Bimonthly
Outlets per PSU: 9

Training: BLS provides training, USDA budgets directly for training, travel and per diem. Training assumptions are as in Appendix 4 with the proviso that there is a one week refresher course every year that has not been included in costs. On the other hand, a 20 percent attrition rate is assumed and the cost of that is included in ongoing costs.

Price collection:

Initiation

23 minutes travel time per outlet
7 hours per outlet (43 items; 10 minutes per item);
Initiation will be carried out for all items/outlets in the first year; after that, one-fifth of outlets each year

Routine Collection

23 minutes travel time per outlet
30 minutes per outlet (estimated 43 items per outlet)

With those parameters, NASS provided the following estimates:

First-year costs: $107,000

Subsequent year costs: $75,000

The first-year costs are higher because of the allowance for 80 hours of training time and because of the price initiation.

Based on the NASS costs, estimates were then made for the cost elements of Section III. The cost elements are in Table A6-1. Table A6-2 shows how the per PSU cost elements of Table A6-1 were derived.

The costs of initiation and routine price collection for other configurations and frequencies are based on the same kinds of calculations that were performed for the BLS-only system. See Table A5-1 in Appendix 5 for those calculations. NASS' estimate of costs for training assumes one representative per PSU but that may be an underestimate.

For the 14 PSU configurations, two cost estimates were calculated. One was for the standard number of quotations and the other was for twice the standard number of quotes. The estimates for twice the standard number of quotes were derived by applying the ratios from the BLS' estimates to NASS' estimate of costs. The specific formula concept is as follows:

$$\frac{\text{BLS cost estimate for twice standard number}}{\text{BLS cost estimate for standard number}} \times \text{NASS estimate for standard number}$$

In the same way, cost estimates were constructed for initiation costs in additional year by using the ratio of BLS costs for the additional year to BLS costs for the first year and applying that ratio to initial year costs of NASS costs.

Contacts

Robin Roark, NASS (phone: 202-720-4028; fax: 202-720-6396)

Jim MacDonald, ERS/FCED (phone: 202-501-6551)

Annette Clausen, ERS/FCED/Food Markets (phone: 202-501-6552)

Bob Milton, for Doug Kleweno, NASS (phone: 202-720-3570)

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TABLE A6-1
PER PSU COST ELEMENTS OF NASS ALTERNATIVE

		Standard Number of Quotes	Twice Standard Numbers of Quotes
i.	Recruiting/supervision	0	0
ii.	Training per trainee (USDA costs)		
	- First Year	$4,000	$4,000
	- Additional Year @ 20%	$800	$800
iii.	Initiation + Training		
	- First Year	$1,143	$2,132
	- Additional Year	$711	$1,116
iv.	Travel to the PSU (incl. in iii and v):	--	--
v.	Routine price collection	$446	$515

TABLE A6-2
DERIVATION OF COST PER PSU COST ELEMENTS

1) First-year costs: $107,000
2) Subsequent year costs: $75,000

Based on 1 and 2, the cost of initiation plus NASS personnel costs for training can be estimated by subtracting (2) from (1) as follows:

Initiation + NASS portion of training costs (personnel costs): (2) - (1) = $32,000

Per PSU costs:

Initiation + training: $32,000/(28*6) = $1,143
Routine collection: $75,000/(28*6) = $446

USDA portion of training costs:

$160 per day food and hotel for 20 days:	$3,200
Two airfares to Washington:	$800
Total:	$4,000

APPENDIX 7

THE BLS/PRIVATE CONTRACTOR ALTERNATIVE: DERIVATION OF COSTS

Two private organizations were contacted for this feasibility study. One provided estimates for the large-staff model while the other provided estimates for the small-staff model. The organization providing the data for the small-staff model provided a relatively complete set of data for initiation, training, and routine price collection. The organization providing estimates for the large-staff model provided only estimates for routine price collection. For it, estimates for initiation were then made using its per PSU data while estimates for training were made by using information presented in Appendix 4.

A. Large-Staff Model

The estimate provided by an organization that could do the price collection was $1,000 per PSU for routine price collection. Included in the $1000 per PSU costs are a senior survey director, a lower level survey director, a financial manager, data preparers, clerks for quality control and some level of computer analysts. Those are in addition to the field representatives who would do the price collection.

Initiation costs were estimated by doubling the $1000 per PSU for routine price collection. The training costs are from Appendix 4.ii. Table A7-1 has the per PSU cost and per trainee estimate for the large-staff model.

TABLE A7-1
PER PSU COST ELEMENTS OF LARGE-STAFF MODEL

		Standard Number of Quotes	Twice Standard Numbers of Quotes
i.	Recruiting/supervision	0	0
ii.	Training per trainee		
	- First Year	$5,872	$5,872
	- Addition Year @ 20%	$1,174	$1,174
iii.	Initiation		
	- First Year	$2,000	$3,731
	- Additional Year	$1,244	$1,953
iv.	Travel to the PSU (incl. in iii and v):	--	--
v.	Routine price collection	$1,000	$1,154

The costs of initiation and routine price collection for other configurations and frequencies are based on the same kinds of calculations performed for BLS. See Appendix 5 for those calculations. The costs for training assume one representative per PSU but that may be an underestimate.

B. Small-Staff Model

The organization providing the estimates of costs for the small-staff model provided the estimates for different configurations and for quarterly and bimonthly frequencies for price collection. The cost for the monthly collection frequency was derived by doubling the bimonthly costs. The costs for the various configurations of PSU's and frequencies can be found in Table A7-2.

TABLE A7-2
COST ELEMENTS OF SMALL-STAFF MODEL

	Number of PSU's		
	28	14	10
Initiation and Training:	$144	$101	$90
Routine Price Collection:			
Quarterly	$240	$132	$107
Bimonthly	$390	$184	$144
± 10%			

As with the large-staff model, the costs presented here include various supervisory personnel as well as other lower level costs for those at the private organization's headquarters who have to check the data as they come in.

For both the large and small-staff models, a 20 percent attrition rate was assumed for training. Also estimates were constructed for twice the number of quotes by using ratios from BLS.

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Appendix 8
Statistician's Final Technical Memo

Prepared under Consulting Agreement USDA/FCS/OAE 003-RB.

A. Richard Bolstein, Ph.D.

The recommendations in this memo are based on JPC's Conceptual Assessment Report, material from the BLS handbook, a paper by Sylvia Leaver, and the view graphs of the paper presented by Robert Baskin and William Johnson on *Estimation of the Variance Components for the U.S. Consumer Price Index* to the Washington Statistical Society earlier this year. Unfortunately, data and certain analysis of variance components requested from the Bureau of Labor Statistics were never delivered. The absence of such data prevents any concrete estimates of sample sizes (number of PSU's, number of outlets and number of items). Recommended procedures are made from an understanding of the general nature of the sampling design and model structure, and reasonable assumptions about the relative sizes of variance components.

Sample Size Recommendations

A. POPS Survey: 140 Households per PSU.

The POPS survey is used to estimate the proportion of food expenditures made at various outlets. These proportions are used as empirical probabilities (estimates of the true probabilities) that a random dollar used for purchase of an item is spent at the outlets. Outlets are then selected according to these probabilities. Therefore, it is important that these proportions be reasonably accurate estimates. Since the POPS survey is to be done entirely by telephone (TPOPS), the number of households sampled in each PSU should be kept at 140, the number used by the Census Bureau for the TPOPS. The reasons for that are twofold: (a) telephone sampling is relatively inexpensive, and (b) a small sample in a rural PSU may lead to large errors in the empirical probabilities if the geographical distribution of outlets within the PSU is not in proportion to the geographical distribution of the population (which is more likely to occur in a rural PSU than in an urban, metro PSU).

B. Number of PSU's.

There are currently 28 non-metropolitan PSU's in the BLS sample, which should serve as the sampling frame. A minimum of eight PSU's should be randomly selected, two from each Census Region. It is possible to augment those selected with two new PSU's from the Northwest if so desired by USDA.

The rationale for this is based on the Baskin-Johnson paper, which showed that the between PSU unit variance is less than one percent of the total unit variance in the CPI-U food-at-home category. This suggests that a minimum number of PSU's can be used. However, it is not known whether or not their result extends to rural PSU's.

1) **Option 1:** Take a subsample of eight rural PSU's, two in each Census Region. This option should suffice to compute a national rural index if the Baskin-Johnson results apply, but may not be suitable to publish a regional rural index.